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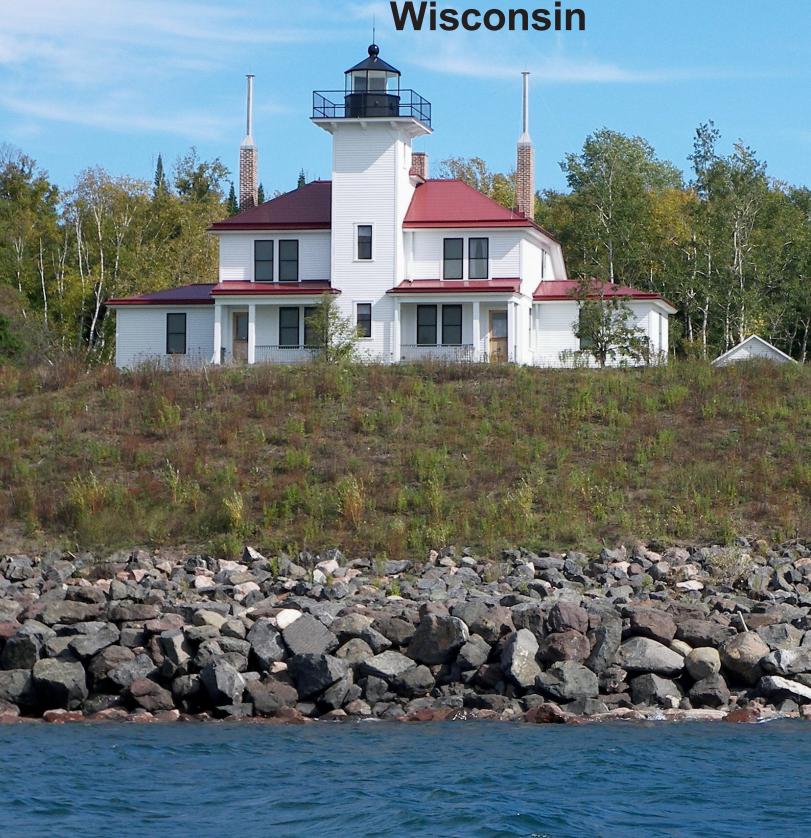
United States
Department
of the Interior



Natural Resources Conservation Service



National Park Service Soil Survey of Apostle Islands National Lakeshore, Wisconsin



## **How To Use This Soil Survey**

This publication consists of text, tables, and maps. The text includes descriptions of detailed soil map units and provides an explanation of the information presented in the tables. It also includes a glossary of terms used in the text and tables and a list of references.

The detailed soil maps can be useful in planning the use and management of small areas. To find information about your area of interest, locate that area on the map sheet. Note the map unit symbols that are in that area. Go to the Contents, which lists the map units by symbol and name and shows where each map unit is described.

The Contents shows which table has data on a specific land use for each detailed soil map unit. Also see the Contents for sections of this publication that may address your specific needs.

## **National Cooperative Soil Survey**

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

The soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, the maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

## **Literature Citation**

The correct citation for this survey is as follows:

United States Department of Agriculture, Natural Resources Conservation Service, and United States Department of the Interior, National Park Service. 2014. Soil survey of Apostle Islands National Lakeshore, Wisconsin. (Accessible online at: <a href="http://soils.usda.gov/survey/printed\_surveys/">http://soils.usda.gov/survey/printed\_surveys/</a>)

## **Cover Caption**

The area around Raspberry Island Light is mapped as Portwing-Herbster complex, 0 to 6 percent slopes, on till plains.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a>.

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## **Preface**

This soil survey was developed in conjunction with the National Park Service's Soil Inventory and Monitoring Program and is intended to serve as the official source document for soils occurring within Apostle Islands National Lakeshore, Wisconsin.

This soil survey contains information that affects current and future land use planning in the park. It contains predictions of soil behavior for selected land uses. The survey highlights soil limitations, actions needed to overcome the limitations, and the impact of selected land uses on the environment. It is designed to meet the needs of the National Park Service and its partners to better understand the properties of the soils in the park and the effects of these properties on various natural ecological characteristics. This knowledge can help the National Park Service and its partners to understand, protect, and enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the park office for Apostle Islands National Lakeshore.

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

United States Department of Agriculture, Natural Resources Conservation Service, and United States Department of the Interior, National Park Service

## **How This Survey Was Made**

This survey was made in conjunction with the National Park Service's Soil Inventory and Monitoring Program to provide information about the soils and miscellaneous areas within Apostle Islands National Lakeshore.

The soil survey data was clipped from the county-based soil surveys of Bayfield County, Wisconsin, and Ashland County, Wisconsin. Both of these surveys were mapped at a scale of 1:12,000. Bayfield County was correlated in October 2005, and Ashland County was correlated in May 2006. The data was last SSURGO-certified in May 2010. The data for this document was extracted in January 2013. In some instances, because data was clipped from more than one county-based set of soil maps, some same-named detailed soil map units may have more than one map symbol and their properties may vary. There are 46 different map units mapped in the park and 197 map unit components.

Sections of this report were reviewed by State-based staff of the Natural Resources Conservation Service, National Park Service personnel, and the soils faculty at the University of California, Davis.

The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils and miscellaneous areas in the survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by

an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units).

Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they delineated the boundaries of these bodies on digital imagery and identified each as a specific map unit.

## **Detailed Soil Map Units**

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the park. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The contrasting components are mentioned in the map unit descriptions. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name

of a soil phase commonly indicates a feature that affects use or management. For example, Allendale loamy fine sand, 0 to 3 percent slopes, is a phase of the Allendale series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes. A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Lerch-Herbster complex, 0 to 3 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Water is an example.

Table 1 lists each map unit in the park, its major and minor components, and the percentage of each component in the unit. Other tables give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

## 433292—Lerch-Herbster complex, 0 to 3 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

**Map Unit Composition** 

Lerch and similar soils: 50 percent Herbster and similar soils: 35 percent Dissimilar minor components: 15 percent

#### **Description of the Lerch Soil**

#### **Taxonomic Classification**

Very fine, mixed, active, nonacid, frigid Vertic Epiaquepts

#### Setting

Landform: Lake plains and till plains

Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent

Down-slope shape: Linear and concave

Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very high

Parent material: Clayey till and/or clayey lacustrine deposits modified by wave action

over loamy and/or sandy stratified lacustrine deposits Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Poorly drained

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Shrink-swell potential: Very high (about 10.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 8

Available water capacity: High (about 9.6 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: D

## Vegetation

Existing plants: Balsam fir, speckled alder, redosier dogwood, balsam poplar, quaking aspen, willow, and eastern arborvitae

## **Typical Profile**

Oa—0 to 3 inches; muck Bg—3 to 7 inches; clay Btg—7 to 12 inches; clay Btk—12 to 29 inches; clay Bk—29 to 56 inches; clay

2C—56 to 80 inches; stratified silt loam to very fine sandy loam to loamy fine sand

## **Description of the Herbster Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Aeric Glossaqualfs

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: High

Parent material: Clayey till and underlying loamy and sandy stratified lacustrine

deposits

Restrictive feature(s): Abrupt textural change at a depth of 40 to 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: High (about 10.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Speckled alder, wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, redosier dogwood, and fragrant bedstraw

#### **Typical Profile**

A—0 to 5 inches; silt loam E—5 to 10 inches; silt loam

B/E—10 to 13 inches; silty clay loam

Bt1—13 to 28 inches; clay

2Bt2—28 to 33 inches; stratified silty clay loam to clay to silty clay 2Btk—33 to 55 inches; stratified silty clay loam to clay to silty clay

3C—55 to 80 inches; stratified very fine sandy loam to silt loam to loamy very fine

sand

#### **Minor Components**

### Munuscong soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: Yes

#### **Pickford soils**

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

#### Shag soils

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

# 433296—Cublake-Croswell-Ashwabay complex, 0 to 6 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,150 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 140 days

#### **Map Unit Composition**

Cublake and similar soils: 35 percent Croswell and similar soils: 20 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 25 percent

#### **Description of the Cublake Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaguic Haplorthods

#### Setting

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent

Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash underlain by stratified silty, loamy, and sandy

glaciofuvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.4 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, starry false Solomon's seal, and lowbush blueberry

## **Typical Profile**

A—0 to 3 inches; sand E—3 to 4 inches; sand Bs—4 to 23 inches; sand BC—23 to 32 inches; sand C1—32 to 40 inches; sand

C2—40 to 48 inches; stratified fine sand to very fine sand

2C3—48 to 60 inches; stratified very fine sandy loam to silt loam

#### **Description of the Croswell Soil**

## **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, stream terraces, lake plains, and lake terraces

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy glacial drift

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Kinnikinnick, swordfern, trailing arbutus, eastern teaberry, twinflower, pin cherry, brackenfern, thimbleberry, starflower, and blueberry

## **Typical Profile**

A—0 to 1 inch; sand E—1 to 7 inches; sand Bs—7 to 16 inches; sand BC—16 to 39 inches; sand C—39 to 60 inches; sand

## **Description of the Ashwabay Soil**

#### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, lake plains, and ground moraines

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

#### **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

## **Minor Components**

#### **Rubicon soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

#### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Sayner soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Sultz soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433299—Cublake-Croswell-Ashwabay complex, 6 to 15 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,150 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 140 days

#### **Map Unit Composition**

Cublake and similar soils: 35 percent Croswell and similar soils: 20 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 25 percent

### **Description of the Cublake Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

#### Setting

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash underlain by stratified silty, loamy, and sandy

glaciofuvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.4 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, starry false Solomon's seal, and lowbush blueberry

#### **Typical Profile**

A—0 to 3 inches; sand E—3 to 4 inches; sand Bs—4 to 23 inches; sand BC—23 to 32 inches; sand C1—32 to 40 inches; sand

C2—40 to 48 inches; stratified fine sand to very fine sand

2C3—48 to 60 inches; stratified very fine sandy loam to silt loam

#### **Description of the Croswell Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, stream terraces, lake plains, and lake terraces

Landform position (two-dimensional): Backslope

Slope range: 6 to 12 percent Down-slope shape: Convex

Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy glacial drift

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

*Existing plants:* Kinnikinnick, swordfern, trailing arbutus, eastern teaberry, twinflower, pin cherry, brackenfern, thimbleberry, starflower, and blueberry

## **Typical Profile**

A—0 to 1 inch; sand E—1 to 7 inches; sand Bs—7 to 16 inches; sand BC—16 to 39 inches; sand C—39 to 60 inches; sand

### **Description of the Ashwabay Soil**

## **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

## **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

## **Minor Components**

#### Rubicon soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

## Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Sayner soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## **Sultz soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433300—Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches

Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

## **Map Unit Composition**

Kellogg and similar soils: 35 percent Allendale and similar soils: 25 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 20 percent

#### **Description of the Kellogg Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

## Setting

Landform: Lake plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy lacustrine or outwash sediments and underlying clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3s

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

#### **Typical Profile**

Oe-0 to 2 inches; moderately decomposed plant material

E—2 to 6 inches; sand Bs—6 to 26 inches; sand 2B/E—26 to 29 inches; silty clay 2Bt—29 to 40 inches; silty clay 2C—40 to 80 inches; silty clay

#### **Description of the Allendale Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

#### Setting

Landform: Lake terraces, outwash plains, ground moraines, and lake plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy sediments and underlying clayey lacustrine or till

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison

ivy, American elm, and violet

#### **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand
Bhs—10 to 13 inches; sand
Bs—13 to 26 inches; sand
E'—26 to 28 inches; sand
2Bt—28 to 34 inches; clay
2C—34 to 60 inches; clay

#### **Description of the Ashwabay Soil**

#### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, lake plains, and ground moraines

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

## **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

#### **Minor Components**

#### **Portwing soils**

Percent of map unit: 8 percent Representative aspect: North Meets hydric soil criteria: No

#### **Cublake soils**

Percent of map unit: 7 percent Representative aspect: North Meets hydric soil criteria: No

## Wakeley soils

Percent of map unit: 5 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 433301—Kellogg-Allendale-Ashwabay complex, 6 to 15 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

## **Map Unit Composition**

Kellogg and similar soils: 40 percent Allendale and similar soils: 25 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 15 percent

#### **Description of the Kellogg Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy lacustrine or outwash sediments and underlying clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Serviceberry, sedge, lily-of-the-valley, hawthorn, strawberry, eastern teaberry, western brackenfern, starflower, and blueberry

### **Typical Profile**

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 6 inches; sand Bs—6 to 26 inches; sand 2B/E—26 to 29 inches; silty clay 2Bt—29 to 40 inches; silty clay 2C—40 to 80 inches; silty clay

#### **Description of the Allendale Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

#### Setting

Landform: Lake terraces, outwash plains, ground moraines, and lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 12 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison ivy, American elm, and violet

#### **Typical Profile**

A—0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand
Bhs—10 to 13 inches; sand
Bs—13 to 26 inches; sand
E´—26 to 28 inches; sand
2Bt—28 to 34 inches; clay
2C—34 to 60 inches; clay

#### **Description of the Ashwabay Soil**

#### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaguic Haplorthods

#### Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

### **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

## **Minor Components**

#### **Portwing soils**

Percent of map unit: 7 percent Representative aspect: North Meets hydric soil criteria: No

## **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Wakeley soils

Percent of map unit: 3 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

## 433304—Sedgwick-Munuscong complex, 0 to 6 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 60 to 120 days

## **Map Unit Composition**

Sedgwick and similar soils: 50 percent Munuscong and similar soils: 30 percent Dissimilar minor components: 20 percent

#### **Description of the Sedgwick Soil**

#### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaquods

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very high

Parent material: Loamy alluvium and underlying clayey till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: High (about 9.8 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Speckled alder, threeseeded sedge, yellow bluebeadlily, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, willow, and blueberry

#### **Typical Profile**

A—0 to 5 inches; sandy loam E—5 to 8 inches; loamy sand Bs—8 to 16 inches; sandy loam 2B/E—16 to 19 inches; clay 2B—19 to 53 inches; clay 2Btk—53 to 80 inches; silty clay

#### **Description of the Munuscong Soil**

#### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, nonacid, frigid Mollic Epiaquepts

#### Setting

Landform: Lake plains and ground moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Medium

Parent material: Loamy glaciofluvial deposits over calcareous clayey materials

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Poorly drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 20

Available water capacity: Moderate (about 8.3 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: B/D

#### Vegetation

Existing plants: Speckled alder, willow, eastern hemlock, and American elm

#### **Typical Profile**

A—0 to 8 inches; fine sandy loam Bg—8 to 30 inches; sandy loam 2C—30 to 60 inches; silty clay

#### **Minor Components**

#### Allendale soils

Percent of map unit: 8 percent

Representative aspect: North Meets hydric soil criteria: No

Superior soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

Herbster soils

Percent of map unit: 4 percent Representative aspect: North Meets hydric soil criteria: No

**Pickford soils** 

Percent of map unit: 3 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

## 433305—Superior-Sedgwick complex, 0 to 6 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

**Map Unit Composition** 

Superior and similar soils: 50 percent Sedgwick and similar soils: 30 percent Dissimilar minor components: 20 percent

#### **Description of the Superior Soil**

#### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

Setting

Landform: Lake plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very high

Parent material: Loamy water-laid deposits and underlying clayey lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 13

Available water capacity: Moderate (about 6.8 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Bigleaf aster, yellow bluebeadlily, bunchberry dogwood, fragrant bedstraw, American fly honeysuckle, Canada beadruby, blackberry, American starflower, and blueberry

#### **Typical Profile**

A—0 to 3 inches; fine sandy loam E—3 to 6 inches; sandy loam Bs—6 to 14 inches; sandy loam 2B/E—14 to 19 inches; clay 2Bt—19 to 26 inches; clay 2C—26 to 60 inches; clay

#### **Description of the Sedgwick Soil**

#### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaquods

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very high

Parent material: Loamy alluvium and underlying clayey till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: High (about 9.8 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Speckled alder, threeseeded sedge, yellow bluebeadlily, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, willow, and blueberry

#### **Typical Profile**

A—0 to 5 inches; loamy sand E—5 to 8 inches; loamy sand Bs—8 to 16 inches; sandy loam 2B/E—16 to 19 inches; clay 2Bt—19 to 53 inches; clay 2Btk—53 to 80 inches; silty clay

## **Minor Components**

#### Allendale soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

## **Portwing soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Munuscong soils

Percent of map unit: 3 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

#### Herbster soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 433309—Superior-Sedgwick complex, 6 to 15 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

## **Map Unit Composition**

Superior and similar soils: 50 percent Sedgwick and similar soils: 30 percent Dissimilar minor components: 20 percent

#### **Description of the Superior Soil**

#### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very high

Parent material: Loamy water-laid deposits and underlying clayey lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 13

Available water capacity: Moderate (about 6.8 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Bigleaf aster, yellow bluebeadlily, bunchberry dogwood, fragrant bedstraw, American fly honeysuckle, Canada beadruby, blackberry, American starflower, and blueberry

#### **Typical Profile**

A—0 to 3 inches; fine sandy loam E—3 to 6 inches; sandy loam Bs—6 to 14 inches; sandy loam 2B/E—14 to 19 inches; clay 2Bt—19 to 26 inches; clay 2C—26 to 60 inches; clay

## **Description of the Sedgwick Soil**

#### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaguods

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 15 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very high

Parent material: Loamy alluvium and underlying clayey till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: High (about 9.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Speckled alder, threeseeded sedge, yellow bluebeadlily, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, willow, and blueberry

# **Typical Profile**

A—0 to 5 inches; loamy sand E—5 to 8 inches; loamy sand Bs—8 to 16 inches; sandy loam 2B/E—16 to 19 inches; clay 2Bt—19 to 53 inches; clay 2Btk—53 to 80 inches; silty clay

# **Minor Components**

# Kellogg soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

# Cornucopia soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Allendale soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Lerch soils

Percent of map unit: 2 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 433310—Sultz-Ashwabay-Rubicon complex, 15 to 45 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,950 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

# **Map Unit Composition**

Sultz and similar soils: 35 percent Ashwabay and similar soils: 25 percent Rubicon and similar soils: 20 percent Dissimilar minor components: 20 percent

#### **Description of the Sultz Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

#### Setting

Landform: Outwash plains, outwash terraces, lake plains, and lake terraces

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash underlain by stratified loamy or loamy and sandy

alluvium or lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Moderate (about 6.3 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

# Vegetation

Existing plants: Spreading dogbane, bigleaf aster, American hazelnut, eastern teaberry, clubmoss, partridgeberry, western brackenfern, starry false Solomon's seal, and blueberry

# **Typical Profile**

Oa—0 to 2 inches; highly decomposed plant material

E—2 to 6 inches; sand Bs—6 to 18 inches; sand BC—18 to 25 inches; sand C—25 to 43 inches; sand

2C-43 to 60 inches; stratified sand to fine sand to loamy sand to very fine sandy loam

# **Description of the Ashwabay Soil**

#### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

# Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 30 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand

Bw—32 to 45 inches; sand

2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

# **Description of the Rubicon Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

#### Setting

Landform: Outwash plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 3.4 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

# Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, Pennsylvania sedge, beaked hazelnut, eastern teaberry, sweet fern, pin cherry, western brackenfern, and blueberry

# **Typical Profile**

A—0 to 1 inch; sand E—1 to 6 inches; sand B—6 to 18 inches; sand BC—18 to 36 inches; sand C—36 to 60 inches; sand

# **Minor Components**

#### Sayner soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

# **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Manistee soils

Percent of map unit: 5 percent

Representative aspect: North Meets hydric soil criteria: No

# 433314—Manistee-Kellogg-Ashwabay complex, 15 to 45 percent slopes

#### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,400 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

# **Map Unit Composition**

Manistee and similar soils: 40 percent Kellogg and similar soils: 30 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 10 percent

# **Description of the Manistee Soil**

# **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Haplorthods

# Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy lacustrine and outwash sediments underlain by clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 15

Available water capacity: Low (about 5.9 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

# Vegetation

Existing plants: Sugar maple, eastern white pine, and eastern hemlock

# **Typical Profile**

A—0 to 3 inches; sand E—3 to 11 inches; sand Bs—11 to 28 inches; sand E′—28 to 30 inches; sand 2Bt—30 to 38 inches; clay 2C—38 to 60 inches; clay

# **Description of the Kellogg Soil**

## **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Lake terraces

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 30 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Sandy lacustrine or outwash sediments and underlying clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Serviceberry, sedge, lily-of-the-valley, hawthorn, strawberry, eastern teaberry, western brackenfern, starflower, and blueberry

#### **Typical Profile**

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 6 inches; sand
Bs—6 to 26 inches; sand
2B/E—26 to 29 inches; silty clay
2Bt—29 to 40 inches; silty clay
2C—40 to 80 inches; silty clay

#### **Description of the Ashwabay Soil**

#### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

## Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

# **Minor Components**

#### Superior soils

Percent of map unit: 4 percent Representative aspect: North Meets hydric soil criteria: No

# Cornucopia soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Sultz soils

Percent of map unit: 3 percent

Representative aspect: North Meets hydric soil criteria: No

# 433326—Rubicon sand, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash;

92—Superior Lake Plain *Elevation:* 600 to 1,800 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 80 to 140 days

# **Map Unit Composition**

Rubicon and similar soils: 85 percent Dissimilar minor components: 15 percent

# **Description of the Rubicon Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

#### Setting

Landform: Outwash plains

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Outwash sands

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

# Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, Pennsylvania sedge, beaked hazelnut, eastern teaberry, sweet fern, pin cherry, western brackenfern, and blueberry

## **Typical Profile**

A—0 to 1 inch; sand E—1 to 6 inches; sand Bs—6 to 18 inches; sand BC—18 to 36 inches; sand C—36 to 60 inches; sand

# **Minor Components**

#### **Croswell soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Karlin soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Sayner soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Sultz soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 433379—Allendale loamy fine sand, 0 to 3 percent slopes

#### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 41 to 46 degrees F

Frost-free period: 90 to 120 days

# **Map Unit Composition**

Allendale and similar soils: 80 percent Dissimilar minor components: 20 percent

# **Description of the Allendale Soil**

# **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

#### Setting

Landform: Outwash plains, lake terraces, ground moraines, and lake plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison

ivy, American elm, and violet

# **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand Bhs—10 to 13 inches; sand Bs—13 to 26 inches; sand E′—26 to 28 inches; sand 2Bt—28 to 34 inches; clay 2C—34 to 60 inches; clay

# **Minor Components**

# Kellogg soils

Percent of map unit: 6 percent Representative aspect: North Meets hydric soil criteria: No

#### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Wakeley soils

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

### Herbster soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# Sedgwick soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 433515—Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes

#### **Map Unit Setting**

Major land resource areas (MLRAs): 90A—Wisconsin and Minnesota Thin Loess and Till, Northern Part; 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,600 feet

Mean annual precipitation: 27 to 43 inches Mean annual air temperature: 36 to 46 degrees F

Frost-free period: 70 to 145 days

# **Map Unit Composition**

Lupton and similar soils: 40 percent Cathro and similar soils: 30 percent Tawas and similar soils: 25 percent Dissimilar minor components: 5 percent

# **Description of the Lupton Soil**

#### **Taxonomic Classification**

Euic, frigid Typic Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous and woody organic material more than 51 inches thick

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Salinity maximum: Not saline
Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 26.0 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Speckled alder, Pennsylvania sedge, willow, eastern arborvitae, and American elm

#### **Typical Profile**

Oa—0 to 65 inches; muck

# **Description of the Cathro Soil**

#### **Taxonomic Classification**

Loamy, mixed, euic, frigid Terric Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material 16 to 51 inches thick underlain by loamy

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Very poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 16.6 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

# Vegetation

Existing plants: Speckled alder and redosier dogwood

# **Typical Profile**

Oa—0 to 28 inches; muck Cg1—28 to 49 inches; loam Cg2—49 to 60 inches; sandy loam

# **Description of the Tawas Soil**

# **Taxonomic Classification**

Sandy or sandy-skeletal, mixed, euic, frigid Terric Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material 16 to 51 inches thick over sandy

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 14.2 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

# Vegetation

Existing plants: Northern maidenhair, speckled alder, bluejoint, sedge, eastern teaberry, tamarack, balsam poplar, quaking aspen, brackenfern, purple pitcherplant, eastern arborvitae, and American elm

# **Typical Profile**

Oa—0 to 31 inches; muck Cg—31 to 60 inches; fine sand

# **Minor Components**

# Seelyeville soils

Percent of map unit: 5 percent

Landform: Depressions on outwash plains and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 433572—Portwing-Herbster complex, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Portwing and similar soils: 50 percent Herbster and similar soils: 30 percent Dissimilar minor components: 20 percent

### **Description of the Portwing Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Oxyaquic Glossudalfs

# Setting

Landform: Till plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: High

Parent material: Clayey till over underlying stratified loamy and sandy lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 11

Available water capacity: High (about 10.0 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: D

## Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, beaked hazelnut, and western brackenfern

# **Typical Profile**

A—0 to 4 inches; silt loam E/B—4 to 9 inches; silt loam Bt—9 to 32 inches; clay Btk—32 to 51 inches; clay

2C-51 to 80 inches; stratified very fine sand to silt

#### **Description of the Herbster Soil**

# **Taxonomic Classification**

Fine, mixed, active, frigid Aeric Glossaqualfs

# Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: High

Parent material: Clayey till and underlying loamy and sandy stratified lacustrine deposits

Restrictive feature(s): Abrupt textural change at a depth of 40 to 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: High (about 10.0 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Speckled alder, wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, redosier dogwood, and fragrant bedstraw

#### **Typical Profile**

A—0 to 5 inches; silt loam E—5 to 10 inches; silt loam

B/E-10 to 13 inches; silty clay loam

Bt1-13 to 28 inches; clay

2Bt2—28 to 33 inches; stratified silty clay loam to clay to silty clay 2Btk—33 to 55 inches; stratified silty clay loam to clay to silty clay

3C—55 to 80 inches; stratified very fine sandy loam to silt loam to loamy very fine sand

### **Minor Components**

# Cornucopia soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Lerch soils

Percent of map unit: 5 percent

Landform: Depressions on till plains and drainageways on till plains

Representative aspect: North Meets hydric soil criteria: Yes

# Sanborg soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Sedgwick soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

# Allendale soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

#### **Badriver soils**

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 433573—Cornucopia silt loam, 6 to 15 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1.095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

# **Map Unit Composition**

Cornucopia and similar soils: 80 percent Dissimilar minor components: 20 percent

# **Description of the Cornucopia Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Haplic Glossudalfs

# Setting

Landform: Till plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very high

Parent material: Clayey till and underlying stratified loamy and sandy lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 11

Available water capacity: High (about 9.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No Hydrologic soil group: D

## Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, spinulose woodfern, American fly honeysuckle, Canada beadruby, western brackenfern, and starflower

#### **Typical Profile**

A-0 to 3 inches; silt loam

E/B—3 to 10 inches; very fine sandy loam

Bt—10 to 32 inches; clay Btk—32 to 45 inches; clay

2Bk-45 to 50 inches; stratified very fine sandy loam to silt loam

2C-50 to 72 inches; stratified very fine sand to silt loam

# **Minor Components**

#### **Manistee soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# **Portwing soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Superior soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433582—Croswell sand, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash;

92—Superior Lake Plain *Elevation:* 600 to 1,465 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

# **Map Unit Composition**

Croswell and similar soils: 82 percent Dissimilar minor components: 18 percent

#### **Description of the Croswell Soil**

# **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

# Setting

Landform: Outwash plains, stream terraces, lake terraces, and lake plains Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy glacial drift

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Kinnikinnick, swordfern, trailing arbutus, eastern teaberry, twinflower, pin cherry, brackenfern, thimbleberry, starflower, and blueberry

# **Typical Profile**

A—0 to 1 inch; sand E—1 to 7 inches; sand Bs—7 to 16 inches; sand BC—16 to 39 inches; sand C—39 to 60 inches; sand

#### **Minor Components**

#### Ashwabay soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Au Gres soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# **Rubicon soils**

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

# 433599—Annalake fine sandy loam, lake terrace, 2 to 6 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,945 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Annalake and similar soils: 85 percent Dissimilar minor components: 15 percent

#### **Description of the Annalake Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Lake terraces

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Stratified sandy and loamy glaciofluvial and glaciolacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.9 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: White baneberry, wild sarsaparilla, Canada beadruby, Clayton's sweetroot, hairy Solomon's seal, twistedstalk, and snow trillium

# **Typical Profile**

A—0 to 3 inches; fine sandy loam E—3 to 6 inches; fine sandy loam

Bs1,Bs2—6 to 17 inches; fine sandy loam E/B—17 to 31 inches; fine sandy loam

Bt-31 to 39 inches; sandy loam

C-39 to 60 inches; stratified fine sand to silt loam

# **Minor Components**

#### Alcona soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

Robago soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

**Cublake soils** 

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

**Neconish soils** 

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 433600—Annalake fine sandy loam, lake terrace, 6 to 15 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,945 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

**Map Unit Composition** 

Annalake and similar soils: 80 percent Dissimilar minor components: 20 percent

# **Description of the Annalake Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Lake terraces

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Medium

Parent material: Stratified sandy and loamy glaciofluvial and glaciolacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.9 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: White baneberry, wild sarsaparilla, Canada beadruby, Clayton's sweetroot, hairy Solomon's seal, twistedstalk, and snow trillium

# **Typical Profile**

A—0 to 3 inches; fine sandy loam E—3 to 6 inches; fine sandy loam

Bs1,Bs2—6 to 17 inches; fine sandy loam E/B—17 to 31 inches; fine sandy loam Bt—31 to 39 inches; sandy loam

C-39 to 60 inches; stratified fine sand to silt loam

#### **Minor Components**

#### Alcona soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Karlin soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Neconish soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Robago soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433671—Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded

#### Map Unit Setting

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 35 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 60 to 110 days

# **Map Unit Composition**

Arnheim and similar soils: 85 percent Dissimilar minor components: 15 percent

# **Description of the Arnheim Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, nonacid, frigid Typic Fluvaquents

# Setting

Landform: Flood plains
Slope range: 0 to 1 percent
Down-slope shape: Linear
Across-slope shape: Linear
Representative aspect: North
Soil temperature class: Frigid
Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Loamy alluvium

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: Frequent
Frequency of ponding: Frequent
Depth to water table: At the soil surface

Drainage class: Poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 11.2 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: D

# Vegetation

Existing plants: Balsam fir, red maple, speckled alder, common ladyfern, sedge, jewelweed, mint, cinnamon fern, willow, sphagnum moss, and nettle

#### **Typical Profile**

A—0 to 5 inches; mucky silt loam Cg—5 to 10 inches; silt loam

C1—10 to 15 inches; very fine sandy loam

C2—15 to 24 inches; silt loam

C3—24 to 60 inches; stratified loamy fine sand to fine sandy loam to very fine sandy loam

#### **Minor Components**

#### Dechamps soils

Percent of map unit: 10 percent

Representative aspect: North Meets hydric soil criteria: No

Moquah soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433676—Redrim very cobbly sand, 0 to 6 percent slopes, very stony

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

**Map Unit Composition** 

Redrim and similar soils: 85 percent Dissimilar minor components: 15 percent

# **Description of the Redrim Soil**

#### **Taxonomic Classification**

Sandy-skeletal, mixed, frigid Entic Lithic Haplorthods

Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy-skeletal beach deposits or residuum from sandstone, or both

Restrictive feature(s): Lithic bedrock at a depth of 10 to 20 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Bigleaf aster, yellow bluebeadlily, eastern teaberry, clubmoss, Canada beadruby, western brackenfern, starflower, and mapleleaf viburnum

# **Typical Profile**

Oe—0 to 1 inch; moderately decomposed plant material Oa—1 to 3 inches; highly decomposed plant material

E-3 to 11 inches; very cobbly sand

Bs—11 to 18 inches; very cobbly loamy sand 2R—18 to 80 inches; unweathered bedrock

# **Minor Components**

# **Brownstone soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Deerton soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Abbaye soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 433679—Lapoin loam, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

# **Map Unit Composition**

Lapoin and similar soils: 85 percent Dissimilar minor components: 15 percent

# **Description of the Lapoin Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Medium

Parent material: Loamy alluvium and clayey till and underlying loamy till Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: Low (about 5.9 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: Canada beadruby, Clayton's sweetroot, western brackenfern, and mapleleaf viburnum

#### **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E—1 to 4 inches; loam Bs—4 to 7 inches; loam 2B/E—7 to 19 inches; clay 2Bt—19 to 34 inches; clay

3C-34 to 39 inches; sandy loam

4R—39 to 80 inches; unweathered bedrock

#### **Minor Components**

# Abbaye soils

Percent of map unit: 8 percent Representative aspect: North Meets hydric soil criteria: No

#### **Brownstone soils**

Percent of map unit: 4 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

# 433686—Zeba sandy loam, 0 to 6 percent slopes, very stony

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Zeba and similar soils: 90 percent

Dissimilar minor components: 10 percent

#### **Description of the Zeba Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Argic Endoaquods

# Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Loamy glacial drift underlain by sandstone bedrock Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 9.4 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Balsam fir, white baneberry, red maple, wild sarsaparilla, yellow birch, sedge, yellow bluebeadlily, bunchberry dogwood, threeleaf goldthread, spinulose woodfern, shining clubmoss, Canada beadruby, mountain woodsorrel, and American starflower

#### **Typical Profile**

A—0 to 2 inches; sandy loam E—2 to 5 inches; sandy loam

Bs—5 to 13 inches; sandy loam E´—13 to 21 inches; sandy loam B/E—21 to 33 inches; sandy loam

2R—33 to 80 inches; unweathered bedrock

#### **Minor Components**

#### Abbave soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Deerton soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433729—Sultz sand, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash;

92—Superior Lake Plain *Elevation:* 695 to 1,950 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

#### **Map Unit Composition**

Sultz and similar soils: 85 percent

Dissimilar minor components: 15 percent

# **Description of the Sultz Soil**

# **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

# Setting

Landform: Lake terraces

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash underlain by stratified loamy or loamy and sandy

alluvium or lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Moderate (about 6.3 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Spreading dogbane, bigleaf aster, American hazelnut, eastern teaberry, clubmoss, partridgeberry, western brackenfern, starry false Solomon's seal, and blueberry

# **Typical Profile**

Oa—0 to 2 inches; highly decomposed plant material

E—2 to 6 inches; sand Bs—6 to 18 inches; sand BC—18 to 25 inches; sand C—25 to 43 inches; sand

2C-43 to 60 inches; stratified sand to fine sand to loamy sand to very fine sandy loam

# **Minor Components**

#### **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Karlin soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# **Rubicon soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 433739—Moquah fine sandy loam, 0 to 3 percent slopes, frequently flooded

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 695 to 1,095 feet

Mean annual precipitation: 28 to 35 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

# Map Unit Composition

Moquah and similar soils: 85 percent Dissimilar minor components: 15 percent

#### **Description of the Moquah Soil**

### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, nonacid, frigid Typic Udifluvents

## Setting

Landform: Flood plains
Slope range: 0 to 3 percent
Down-slope shape: Linear
Across-slope shape: Linear
Representative aspect: North
Soil temperature class: Frigid
Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Loamy alluvium

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: Frequent Frequency of ponding: None

Depth to water table: About 30 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.0 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 4w

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: White baneberry, wild sarsaparilla, Canada beadruby, naked miterwort, Clayton's sweetroot, hairy Solomon's seal, twistedstalk, and snow trillium

# **Typical Profile**

A—0 to 5 inches; fine sandy loam

C1—5 to 19 inches; stratified fine sandy loam to silt loam to fine sand

C2—19 to 48 inches; stratified very fine sandy loam to silt loam to fine sand

C3—48 to 55 inches; silt loam

C4—55 to 60 inches; stratified sand to fine sand

#### **Minor Components**

# **Dechamps soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

#### **Arnheim soils**

Percent of map unit: 5 percent Landform: Flood plains Representative aspect: North Meets hydric soil criteria: Yes

# 433771—Beaches, 2 to 12 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

# **Map Unit Composition**

Beaches: 97 percent

Dissimilar minor components: 3 percent

#### **Description of Beaches**

This map unit consists of non-vegetated sandy areas along the shoreline.

# **Minor Components**

#### **Psammaguents**

Percent of map unit: 3 percent Landform: Depressions Representative aspect: North Meets hydric soil criteria: Yes

# 433802—Udorthents, ravines and escarpments, 25 to 60 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

# Map Unit C]omposition

Udorthents, ravines and escarpments and similar soils: 85 percent Dissimilar minor components: 15 percent

# **Description of Udorthents, Ravines and Escarpments**

### **Taxonomic Classification**

Udorthents

#### General

This map unit consists of very steep soils of variable depth, along ravines and escarpments. These areas commonly provide good wildlife habitat.

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7e Meets hydric soil criteria: No Hydrologic soil group: C

#### **Minor Components**

#### Alcona soils

Percent of map unit: 5 percent Meets hydric soil criteria: No

# Moquah soils

Percent of map unit: 5 percent Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent Meets hydric soil criteria: No

# 452739-Water

# **Map Unit Setting**

Major land resource areas (MLRAs): 90A—Wisconsin and Minnesota Thin Loess and Till, Northern Part; 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

#### Map Unit Composition

Water: 100 percent

# **Description of Water**

This map unit consists of freshwater lakes and ponds.

# 452765—Abbaye-Lapoin complex, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

# **Map Unit Composition**

Abbaye and similar soils: 55 percent Lapoin and similar soils: 40 percent Dissimilar minor components: 5 percent

#### **Description of the Abbaye Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

# Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Till underlain by sandstone bedrock

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.7 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Balsam fir, sugar maple, yellow birch, sedge, yellow bluebeadlily, spinulose woodfern, shining clubmoss, Canada beadruby, hairy Solomon's seal, red elderberry, feather Solomon's seal, twistedstalk, and American starflower

# **Typical Profile**

Oi—0 to 2 inches; slightly decomposed plant material

A—2 to 4 inches; sandy loam
E—4 to 13 inches; loamy sand
Bs—13 to 25 inches; sandy loam
B/E—25 to 32 inches; sandy loam

2R—32 to 80 inches; unweathered bedrock

# **Description of the Lapoin Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Alfic Oxyaquic Haplorthods

# Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Medium

Parent material: Loamy alluvium and clayey till and underlying loamy till Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: Low (about 5.9 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Canada beadruby, Clayton's sweetroot, western brackenfern, and mapleleaf viburnum

# **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E—1 to 4 inches; loam Bs—4 to 7 inches; loam 2B/E—7 to 19 inches; clay 2Bt—19 to 34 inches; clay

3C—34 to 39 inches; sandy loam

4R-39 to 80 inches; unweathered bedrock

# **Minor Components**

#### Zeba soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1383557—Au Gres loamy sand, 0 to 3 percent slopes

# **Map Unit Setting**

Major land resource areas (MLRAs): 90A—Wisconsin and Minnesota Thin Loess and Till, Northern Part; 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,800 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

# **Map Unit Composition**

Au Gres and similar soils: 85 percent Dissimilar minor components: 15 percent

#### **Description of the Au Gres Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Typic Endoaquods

#### Settina

Landform: Outwash plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 6 inches (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 4w

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Leatherleaf, American hazelnut, bunchberry dogwood, common ninebark, blackberry, eastern hemlock, and blueberry

# **Typical Profile**

Oa—0 to 2 inches; highly decomposed plant material

E—2 to 5 inches; loamy sand Bhs—5 to 8 inches; loamy sand Bs—8 to 16 inches; loamy sand BC—16 to 28 inches; sand C—28 to 60 inches; sand

#### **Minor Components**

#### **Croswell soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Kinross soils

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

# Flink soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Chinwhisker soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1383580—Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes

# **Map Unit Setting**

Major land resource areas (MLRAs): 90A—Wisconsin and Minnesota Thin Loess and Till, Northern Part; 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,400 feet

Mean annual precipitation: 24 to 45 inches Mean annual air temperature: 36 to 45 degrees F

Frost-free period: 60 to 140 days

## **Map Unit Composition**

Loxley and similar soils: 40 percent Beseman and similar soils: 30 percent Dawson and similar soils: 28 percent Dissimilar minor components: 2 percent

#### **Description of the Loxley Soil**

#### **Taxonomic Classification**

Dysic, frigid Typic Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material more than 51 inches thick

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Occasional
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 26.5 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### **Typical Profile**

Oe—0 to 13 inches; mucky peat Oa—13 to 60 inches; muck

#### **Description of the Beseman Soil**

#### **Taxonomic Classification**

Loamy, mixed, dysic, frigid Terric Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material 16 to 51 inches thick over loamy till

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Occasional
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 18.2 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

# **Typical Profile**

Oa—0 to 36 inches; muck Cg—36 to 60 inches; loam

# **Description of the Dawson Soil**

# **Taxonomic Classification**

Sandy or sandy-skeletal, mixed, dysic, frigid Terric Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Sphagnum moss and herbaceous organic material 16 to 51 inches

thick over sandy or sandy and gravelly deposits Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Occasional
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 18.2 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

## **Typical Profile**

Oi—0 to 8 inches; peat
Oa—8 to 38 inches; muck
A—38 to 40 inches; silt loam
2C—40 to 60 inches; sand

## **Minor Components**

#### Uskabwanka soils

Percent of map unit: 2 percent

Landform: Depressions on disintegration moraines

Representative aspect: North Meets hydric soil criteria: Yes

## 1383581—Rifle peat, 0 to 1 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 60 to 110 days

## **Map Unit Composition**

Rifle and similar soils: 90 percent

Dissimilar minor components: 10 percent

#### **Description of the Rifle Soil**

#### **Taxonomic Classification**

Euic, frigid Typic Haplohemists

#### Setting

Landform: Depressions on moraines, depressions on outwash plains, and depressions

on lake plains

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Organic deposits more than 51 inches thick Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Depth to water table: At the soil surface Drainage class: Very poorly drained

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 30.3 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Balsam fir, sedge, and eastern arborvitae

## **Typical Profile**

Oi-0 to 4 inches; peat

Oe—4 to 60 inches; mucky peat

### **Minor Components**

#### **Dawson soils**

Percent of map unit: 5 percent

*Landform:* Depressions on lake plains, depressions on moraines, bogs on lake plains, bogs on moraines, depressions on outwash plains, and bogs on outwash plains

Representative aspect: North Meets hydric soil criteria: Yes

#### Loxley soils

Percent of map unit: 5 percent

*Landform:* Depressions on lake plains, depressions on moraines, bogs on lake plains, bogs on moraines, depressions on outwash plains, and bogs on outwash plains

Representative aspect: North Meets hydric soil criteria: Yes

## 1383603—Cornucopia silt loam, 15 to 45 percent slopes

#### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Cornucopia and similar soils: 80 percent Dissimilar minor components: 20 percent

## **Description of the Cornucopia Soil**

## **Taxonomic Classification**

Fine, mixed, active, frigid Haplic Glossudalfs

#### Setting

Landform: Till plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very high

Parent material: Clayey till and underlying stratified loamy and sandy lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 11

Available water capacity: High (about 9.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7e

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, spinulose woodfern, American fly honeysuckle, Canada beadruby, western brackenfern, and starflower

## **Typical Profile**

A-0 to 3 inches; silt loam

E/B—3 to 10 inches; very fine sandy loam

Bt—10 to 32 inches; clay Btk—32 to 45 inches; clay

2Bk-45 to 50 inches; stratified very fine sandy loam to silt loam

2C-50 to 72 inches; stratified very fine sand to silt loam

## **Minor Components**

#### Manistee soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Moquah soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## **Portwing soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1383658—Deerton-Brownstone complex, 0 to 6 percent slopes, very stony

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Deerton and similar soils: 50 percent Brownstone and similar soils: 40 percent Dissimilar minor components: 10 percent

## **Description of the Deerton Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Typic Haplorthods

Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash beach deposits or sandy residuum from sandstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.6 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Balsam fir, sugar maple, sedge, spinulose woodfern, trailing arbutus, eastern teaberry, Canada beadruby, blackberry, thimbleberry, and American starflower

#### **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E—1 to 9 inches; sand

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Bhs—9 to 10 inches; loamy sand Bs—10 to 25 inches; sand

2Cr—25 to 39 inches; weathered bedrock 2R—39 to 80 inches; unweathered bedrock

## **Description of the Brownstone Soil**

#### **Taxonomic Classification**

Sandy-skeletal, mixed, frigid Typic Haplorthods

Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy-skeletal beach deposits or residuum from sandstone, or both

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 3.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Aster, sedge, yellow bluebeadlily, running clubmoss, Canada beadruby, Clayton's sweetroot, western brackenfern, blackberry, starry false Solomon's seal, starflower, and mapleleaf viburnum

## **Typical Profile**

Oa—0 to 2 inches; highly decomposed plant material

E-2 to 12 inches; very cobbly sand

Bhs—12 to 15 inches; extremely gravelly coarse sand

Bs—15 to 23 inches; extremely cobbly sand

BC-23 to 33 inches; extremely cobbly coarse sand

2R—33 to 80 inches; unweathered bedrock

#### **Minor Components**

## Redrim soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Abbaye soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1383660—Deerton-Brownstone complex, 6 to 15 percent slopes, very stony

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Deerton and similar soils: 50 percent Brownstone and similar soils: 40 percent Dissimilar minor components: 10 percent

#### **Description of the Deerton Soil**

## **Taxonomic Classification**

Sandy, mixed, frigid Typic Haplorthods

## Setting

Landform: Hills

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash beach deposits or sandy residuum from sandstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.6 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

### Vegetation

Existing plants: Balsam fir, sugar maple, sedge, spinulose woodfern, trailing arbutus, eastern teaberry, Canada beadruby, blackberry, thimbleberry, and American starflower

## **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E-1 to 9 inches; sand

Bhs—9 to 10 inches; loamy sand Bs—10 to 25 inches; sand

2Cr—25 to 39 inches; weathered bedrock 2R—39 to 80 inches; unweathered bedrock

## **Description of the Brownstone Soil**

#### **Taxonomic Classification**

Sandy-skeletal, mixed, frigid Typic Haplorthods

#### Setting

Landform: Hills

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy-skeletal beach deposits or residuum from sandstone, or both

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 3.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Aster, sedge, yellow bluebeadlily, running clubmoss, Canada beadruby, Clayton's sweetroot, western brackenfern, blackberry, starry false Solomon's seal, starflower, and mapleleaf viburnum

## **Typical Profile**

Oa—0 to 2 inches; highly decomposed plant material

E-2 to 12 inches; very cobbly sand

Bhs—12 to 15 inches; extremely gravelly coarse sand

Bs-15 to 23 inches; extremely cobbly sand

BC-23 to 33 inches; extremely cobbly coarse sand

2R—33 to 80 inches; unweathered bedrock

#### **Minor Components**

#### Redrim soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Abbaye soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

## 1383662—Abbaye loamy sand, 6 to 15 percent slopes

### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Abbaye and similar soils: 90 percent Dissimilar minor components: 10 percent

#### **Description of the Abbaye Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

#### Settina

Landform: Hills

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Medium

Parent material: Till underlain by sandstone bedrock

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.7 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Balsam fir, sugar maple, yellow birch, sedge, yellow bluebeadlily, spinulose woodfern, shining clubmoss, Canada beadruby, hairy Solomon's seal, red elderberry, feather Solomon's seal, twistedstalk, and American starflower

### **Typical Profile**

Oi-0 to 2 inches; slightly decomposed plant material

A—2 to 4 inches; loamy sand E—4 to 13 inches; loamy sand Bs—13 to 25 inches; sandy loam B/E—25 to 32 inches; sandy loam

2R—32 to 80 inches; unweathered bedrock

## **Minor Components**

#### **Deerton soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1383665—Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 60 to 120 days

#### **Map Unit Composition**

Allendale and similar soils: 35 percent Wakeley and similar soils: 30 percent Kinross and similar soils: 20 percent Dissimilar minor components: 15 percent

#### **Description of the Allendale Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

#### Setting

Landform: Lake terraces, outwash plains, ground moraines, and lake plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison ivy, American elm, and violet

## **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand Bhs—10 to 13 inches; sand Bs—13 to 26 inches; sand E'—26 to 28 inches; sand 2Bt—28 to 34 inches; clay 2C—34 to 60 inches; clay

## **Description of the Wakeley Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, nonacid, frigid Aeric Epiaquents

#### Setting

Landform: Outwash plains and lake plains Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash and lacustrine material underlain by clayey lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Very poorly drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: Moderate (about 8.9 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: B/D

#### Vegetation

Existing plants: Speckled alder, marsh marigold, redosier dogwood, threeleaf

goldthread, water horsetail, and eastern arborvitae

#### **Typical Profile**

Oa—0 to 4 inches; muck C—4 to 23 inches; loamy sand Cg—23 to 28 inches; loamy sand

2C-28 to 80 inches; clay

#### **Description of the Kinross Soil**

## **Taxonomic Classification**

Sandy, mixed, frigid Typic Endoaquods

#### Setting

Landform: Stream terraces, outwash plains, and lake plains

Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Glaciofluvial material

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Very poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Balsam fir, speckled alder, jack pine, eastern arborvitae, eastern

hemlock, and blueberry

### **Typical Profile**

Oa—0 to 6 inches; muck E—6 to 10 inches; sand Bhs—10 to 12 inches; sand Bs—12 to 24 inches; sand BC—24 to 42 inches; sand C—42 to 60 inches; sand

#### **Minor Components**

#### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Sedgwick soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Tawas soils

Percent of map unit: 5 percent Landform: Depressions Representative aspect: North Meets hydric soil criteria: Yes

## 1383960—Flink sand, 0 to 3 percent slopes

## **Map Unit Setting**

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash;

92—Superior Lake Plain *Elevation:* 600 to 1,895 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

## **Map Unit Composition**

Flink and similar soils: 75 percent

Dissimilar minor components: 25 percent

## **Description of the Flink Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Typic Epiaquods

### Setting

Landform: Lake plains, outwash plains, lake terraces, and outwash terraces

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent

Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash underlain by stratified silty, loamy, and sandy

glaciofluvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 10.4 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Speckled alder, sedge, yellow bluebeadlily, American hazelnut, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, blackberry, and blueberry

#### **Typical Profile**

Oe—0 to 2 inches; moderately decomposed plant material Oa—2 to 3 inches; highly decomposed plant material

E—3 to 6 inches; sand Bhs—6 to 9 inches; sand Bs—9 to 26 inches; sand BC—26 to 35 inches; sand C—35 to 46 inches; sand

2Cg-46 to 52 inches; stratified silt to silty clay loam

2C—52 to 80 inches; stratified silt to silty clay loam to loamy very fine sand

## **Minor Components**

#### Allendale soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Au Gres soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Kinross soils

Percent of map unit: 5 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

Robago soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444357—Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded

## **Map Unit Setting**

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 35 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 60 to 110 days

### **Map Unit Composition**

Arnheim and similar soils: 85 percent Dissimilar minor components: 15 percent

### **Description of the Arnheim Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, nonacid, frigid Typic Fluvaquents

## Setting

Landform: Flood plains
Slope range: 0 to 1 percent
Down-slope shape: Linear
Across-slope shape: Linear
Representative aspect: North
Soil temperature class: Frigid
Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Loamy alluvium

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: Frequent
Frequency of ponding: Frequent
Depth to water table: At the soil surface

Deptir to water table. At the soil surface

Drainage class: Poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 11.2 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: D

## Vegetation

Existing plants: Balsam fir, red maple, speckled alder, common ladyfern, sedge, jewelweed, mint, cinnamon fern, willow, sphagnum moss, and nettle

#### **Typical Profile**

A—0 to 5 inches; mucky silt loam Cg—5 to 10 inches; silt loam

C1—10 to 15 inches; very fine sandy loam

C2—15 to 24 inches; silt loam

C3—24 to 60 inches; stratified loamy fine sand to fine sandy loam to very fine sandy loam

### **Minor Components**

## **Dechamps soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

## Moquah soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## 1444359—Beaches, 2 to 12 percent slopes

#### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

**Map Unit Composition** 

Beaches: 97 percent

Dissimilar minor components: 3 percent

#### **Description of Beaches**

This map unit consist of non-soil areas along the shoreline.

#### **Minor Components**

#### **Psammaquents**

Percent of map unit: 3 percent Landform: Depressions Meets hydric soil criteria: Yes

# 1444367—Udorthents, ravines and escarpments, 25 to 60 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

## **Map Unit Composition**

Udorthents, ravines and escarpments and similar soils: 85 percent

Dissimilar minor components: 15 percent

#### **Description of Udorthents, Ravines and Escarpments**

#### **Taxonomic Classification**

Udorthents

#### General

This map unit consists of very steep soils of variable depth, along ravines and escarpments. These areas commonly provide good wildlife habitat.

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7e

Meets hydric soil criteria: No Hydrologic soil group: C

#### **Minor Components**

#### Alcona soils

Percent of map unit: 5 percent Meets hydric soil criteria: No

#### Moquah soils

Percent of map unit: 5 percent Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent Meets hydric soil criteria: No

# 1444378—Wakefield fine sandy loam, 1 to 6 percent slopes, stony

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 1,295 to 1,600 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 100 to 120 days

#### **Map Unit Composition**

Wakefield and similar soils: 85 percent Dissimilar minor components: 15 percent

## **Description of the Wakefield Soil**

## **Taxonomic Classification**

Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Fragiorthods

## Setting

Landform: Till plains

Landform position (two-dimensional): Summit

Slope range: 1 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Very high

Parent material: Modified loamy eolian deposits and underlying loamy till

Restrictive feature(s): Fragipan at a depth of 16 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.5 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 2e

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Sugar maple and hazelnut

### **Typical Profile**

A—0 to 4 inches; fine sandy loam E—4 to 7 inches; fine sandy loam Bs—7 to 18 inches; fine sandy loam

2Bx—18 to 24 inches; very fine sandy loam 2(E/B)x—24 to 36 inches; fine sandy loam

2Bt-36 to 49 inches; loam

2C-49 to 64 inches; fine sandy loam

## **Minor Components**

#### Tula soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

### Morganlake soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444379—Wakefield fine sandy loam, 6 to 18 percent slopes, stony

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 1,295 to 1,600 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 100 to 120 days

#### **Map Unit Composition**

Wakefield and similar soils: 85 percent Dissimilar minor components: 15 percent

## **Description of the Wakefield Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Fragiorthods

#### Setting

Landform: Till plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 18 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very high

Parent material: Modified loamy eolian deposits and underlying loamy till

Restrictive feature(s): Fragipan at a depth of 16 to 24 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 8.5 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Sugar maple and hazelnut

#### **Typical Profile**

A—0 to 4 inches; fine sandy loam E—4 to 7 inches; fine sandy loam Bs—7 to 18 inches; fine sandy loam

2Bx—18 to 24 inches; very fine sandy loam 2(E/B)x—24 to 36 inches; fine sandy loam

2Bt-36 to 49 inches; loam

2C-49 to 64 inches; fine sandy loam

#### **Minor Components**

#### Morganlake soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent

Representative aspect: North Meets hydric soil criteria: No

Tula soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444388—Allendale loamy fine sand, 0 to 3 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 41 to 46 degrees F

Frost-free period: 90 to 120 days

**Map Unit Composition** 

Allendale and similar soils: 80 percent Dissimilar minor components: 20 percent

#### **Description of the Allendale Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

#### Setting

Landform: Outwash plains, lake terraces, ground moraines, and lake plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

#### Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison ivy, American elm, and violet

## **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand Bhs—10 to 13 inches; sand Bs—13 to 26 inches; sand E´—26 to 28 inches; sand 2Bt—28 to 34 inches; clay 2C—34 to 60 inches; clay

## **Minor Components**

## Kellogg soils

Percent of map unit: 6 percent Representative aspect: North Meets hydric soil criteria: No

#### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Wakeley soils

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

#### Herbster soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

## Sedgwick soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

## 1444402—Tonkey sandy loam, 0 to 2 percent slopes

#### **Map Unit Setting**

Major land resource areas (MLRAs): 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 30 inches Mean annual air temperature: 43 to 46 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Tonkey and similar soils: 90 percent Dissimilar minor components: 10 percent

## **Description of the Tonkey Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, semiactive, nonacid, frigid Mollic Endoaquepts

#### Setting

Landform: Depressions on lake plains and drainageways on lake plains

Slope range: 0 to 2 percent

Down-slope shape: Linear and concave

Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Stratified loamy and sandy glaciofluvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Moderate (about 7.5 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: B/D

## Vegetation

Existing plants: Speckled alder, bluejoint, sedge, redosier dogwood, willow, eastern

arborvitae, American elm, and American cranberrybush

#### **Typical Profile**

Ap—0 to 8 inches; sandy loam Bg1—8 to 14 inches; sandy loam Bg2—14 to 28 inches; loam

2C-28 to 60 inches; stratified sand to loam to silt loam

## **Minor Components**

#### Robago soils

Percent of map unit: 6 percent Representative aspect: North Meets hydric soil criteria: No

#### Shaq soils

Percent of map unit: 4 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 1444410—Tula fine sandy loam, 1 to 6 percent slopes, stony

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 1,295 to 1,595 feet

Mean annual precipitation: 30 to 34 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 100 to 120 days

**Map Unit Composition** 

Tula and similar soils: 80 percent

Dissimilar minor components: 20 percent

## **Description of the Tula Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, superactive, frigid Argic Fragiaquods

#### Setting

Landform: End moraines and ground moraines Landform position (two-dimensional): Footslope

Slope range: 0 to 4 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: High

Parent material: Modified loamy eolian material and underlying loamy till

Restrictive feature(s): Fragipan at a depth of 15 to 30 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 2w

Meets hydric soil criteria: No Hydrologic soil group: D

## Vegetation

Existing plants: Bigleaf aster, common ladyfern, sedge, yellow bluebeadlily, threeleaf goldthread, spinulose woodfern, clubmoss, rare clubmoss, Canada beadruby, mountain woodsorrel, western brackenfern, and claspleaf twistedstalk

## **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

A—1 to 5 inches; fine sandy loam E—5 to 8 inches; fine sandy loam

Bs1—8 to 20 inches; cobbly very fine sandy loam 2Bs2—20 to 28 inches; gravelly sandy loam 2(E/B)x—28 to 37 inches; gravelly sandy loam 2(B/E)x—37 to 62 inches; gravelly loam 2C—62 to 80 inches; gravelly sandy loam

### **Minor Components**

## Gogebic soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

#### Pleine soils

Percent of map unit: 5 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

#### losco soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Herbster soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1444414—Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes

## **Map Unit Setting**

Major land resource areas (MLRAs): 90A—Wisconsin and Minnesota Thin Loess and Till, Northern Part; 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,600 feet

Mean annual precipitation: 27 to 43 inches Mean annual air temperature: 36 to 46 degrees F

Frost-free period: 70 to 145 days

#### **Map Unit Composition**

Lupton and similar soils: 40 percent Cathro and similar soils: 30 percent Tawas and similar soils: 25 percent Dissimilar minor components: 5 percent

## **Description of the Lupton Soil**

#### **Taxonomic Classification**

Euic, frigid Typic Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous and woody organic material more than 51 inches thick

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Salinity maximum: Not saline
Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 26.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Speckled alder, Pennsylvania sedge, willow, eastern arborvitae, and

American elm

## **Typical Profile**

Oa-0 to 65 inches; muck

#### **Description of the Cathro Soil**

#### **Taxonomic Classification**

Loamy, mixed, euic, frigid Terric Haplosaprists

## Setting

Landform: Depressions on disintegration moraines

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material 16 to 51 inches thick underlain by loamy

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Very poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 16.6 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Speckled alder and redosier dogwood

## **Typical Profile**

Oa—0 to 28 inches; muck Cg1—28 to 49 inches; loam Cg2—49 to 60 inches; sandy loam

#### **Description of the Tawas Soil**

#### **Taxonomic Classification**

Sandy or sandy-skeletal, mixed, euic, frigid Terric Haplosaprists

### Setting

Landform: Depressions on disintegration moraines

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material 16 to 51 inches thick over sandy

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Depth to water table: At the soil surface Drainage class: Very poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 14.2 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Northern maidenhair, speckled alder, bluejoint, sedge, eastern teaberry, tamarack, balsam poplar, quaking aspen, brackenfern, purple pitcherplant, eastern arborvitae, and American elm

## **Typical Profile**

Oa—0 to 31 inches; muck Cg—31 to 60 inches; fine sand

#### **Minor Components**

#### Seelyeville soils

Percent of map unit: 5 percent

Landform: Depressions on outwash plains

Representative aspect: North Meets hydric soil criteria: Yes

## 1444425—Lerch-Herbster complex, 0 to 3 percent slopes

### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Lerch and similar soils: 50 percent Herbster and similar soils: 35 percent Dissimilar minor components: 15 percent

### **Description of the Lerch Soil**

#### **Taxonomic Classification**

Very fine, mixed, active, nonacid, frigid Vertic Epiaquepts

#### Setting

Landform: Lake plains and till plains

Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent

Down-slope shape: Linear and concave

Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very high

Parent material: Clayey till and/or clayey lacustrine deposits modified by wave action

over loamy and/or sandy stratified lacustrine deposits Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Poorly drained

Shrink-swell potential: Very high (about 10.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 8

Available water capacity: High (about 9.6 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: D

## Vegetation

Existing plants: Balsam fir, speckled alder, redosier dogwood, balsam poplar, quaking aspen, willow, and eastern arborvitae

## **Typical Profile**

Oa—0 to 3 inches; muck Bg—3 to 7 inches; clay Btg—7 to 12 inches; clay Btk—12 to 29 inches; clay Bk—29 to 56 inches; clay

2C-56 to 80 inches; stratified silt loam to very fine sandy loam to loamy fine sand

### **Description of the Herbster Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Aeric Glossaqualfs

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: High

Parent material: Clayey till and underlying loamy and sandy stratified lacustrine deposits

Restrictive feature(s): Abrupt textural change at a depth of 40 to 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: High (about 10.0 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

## Vegetation

Existing plants: Speckled alder, wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, redosier dogwood, and fragrant bedstraw

## **Typical Profile**

A—0 to 5 inches; silt loam E—5 to 10 inches; silt loam

B/E—10 to 13 inches; silty clay loam

Bt1—13 to 28 inches; clay

2Bt2—28 to 33 inches; stratified silty clay loam to clay to silty clay 2Btk—33 to 55 inches; stratified silty clay loam to clay to silty clay

3C—55 to 80 inches; stratified very fine sandy loam to silt loam to loamy very fine sand

#### **Minor Components**

### Munuscong soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: Yes

#### **Pickford soils**

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

#### Shaq soils

Percent of map unit: 5 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

# 1444426—Portwing-Herbster complex, 0 to 6 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Portwing and similar soils: 50 percent Herbster and similar soils: 30 percent Dissimilar minor components: 20 percent

#### **Description of the Portwing Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Oxyaquic Glossudalfs

## Setting

Landform: Till plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: High

Parent material: Clayey till over underlying stratified loamy and sandy lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

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Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 11

Available water capacity: High (about 10.0 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, beaked hazelnut, and western brackenfern

### **Typical Profile**

A—0 to 4 inches; silt loam E/B—4 to 9 inches; silt loam Bt—9 to 32 inches; clay Btk—32 to 51 inches; clay

2C-51 to 80 inches; stratified very fine sand to silt

## **Description of the Herbster Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Aeric Glossaqualfs

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: High

Parent material: Clayey till and underlying loamy and sandy stratified lacustrine deposits

Restrictive feature(s): Abrupt textural change at a depth of 40 to 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: High (about 10.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Speckled alder, wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, redosier dogwood, and fragrant bedstraw

### **Typical Profile**

A—0 to 5 inches; silt loam E—5 to 10 inches; silt loam

B/E—10 to 13 inches; silty clay loam

Bt1—13 to 28 inches; clay

2Bt2—28 to 33 inches; stratified silty clay loam to clay to silty clay 2Btk—33 to 55 inches; stratified silty clay loam to clay to silty clay

3C—55 to 80 inches; stratified very fine sandy loam to silt loam to loamy very fine

sand

## **Minor Components**

### Cornucopia soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Lerch soils

Percent of map unit: 5 percent

Landform: Depressions on till plains and drainageways on till plains

Representative aspect: North Meets hydric soil criteria: Yes

#### Sanborg soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Sedgwick soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Allendale soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

#### **Badriver soils**

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

## 1444427—Cornucopia silt loam, 6 to 15 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Cornucopia and similar soils: 80 percent Dissimilar minor components: 20 percent

### **Description of the Cornucopia Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Haplic Glossudalfs

#### Setting

Landform: Till plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very high

Parent material: Clayey till and underlying stratified loamy and sandy lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 11

Available water capacity: High (about 9.1 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No Hydrologic soil group: D

#### Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, spinulose woodfern, American fly honeysuckle, Canada beadruby, western brackenfern, and starflower

#### **Typical Profile**

A-0 to 3 inches; silt loam

E/B—3 to 10 inches; very fine sandy loam

Bt—10 to 32 inches; clay Btk—32 to 45 inches; clay

2Bk-45 to 50 inches; stratified very fine sandy loam to silt loam

2C-50 to 72 inches; stratified very fine sand to silt loam

## **Minor Components**

#### Manistee soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Portwing soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Superior soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## 1444428—Cornucopia silt loam, 15 to 45 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Cornucopia and similar soils: 80 percent Dissimilar minor components: 20 percent

#### **Description of the Cornucopia Soil**

#### **Taxonomic Classification**

Fine, mixed, active, frigid Haplic Glossudalfs

#### Setting

Landform: Till plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very high

Parent material: Clayey till and underlying stratified loamy and sandy lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 11

Available water capacity: High (about 9.1 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 7e

Meets hydric soil criteria: No Hydrologic soil group: D

## Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, yellow bluebeadlily, bunchberry dogwood, beaked hazelnut, spinulose woodfern, American fly honeysuckle, Canada beadruby, western brackenfern, and starflower

#### **Typical Profile**

A-0 to 3 inches; silt loam

E/B—3 to 10 inches; very fine sandy loam

Bt—10 to 32 inches; clay Btk—32 to 45 inches; clay

2Bk-45 to 50 inches; stratified very fine sandy loam to silt loam

2C-50 to 72 inches; stratified very fine sand to silt loam

#### **Minor Components**

#### **Manistee soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Moquah soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Odanah soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## **Portwing soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## 1444431—Croswell sand, 0 to 6 percent slopes

## **Map Unit Setting**

Major land resource areas (MLRAs): 91B—Wisconsin and Minnesota Sandy Outwash;

92—Superior Lake Plain *Elevation:* 600 to 1,465 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

#### **Map Unit Composition**

Croswell and similar soils: 82 percent Dissimilar minor components: 18 percent

## **Description of the Croswell Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, stream terraces, lake terraces, and lake plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy glacial drift

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Kinnikinnick, swordfern, trailing arbutus, eastern teaberry, twinflower, pin cherry, brackenfern, thimbleberry, starflower, and blueberry

## **Typical Profile**

A—0 to 1 inch; sand E—1 to 7 inches; sand Bs—7 to 16 inches; sand BC—16 to 39 inches; sand C—39 to 60 inches; sand

## **Minor Components**

#### Ashwabay soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Au Gres soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Cublake soils**

Percent of map unit: 5 percent

Representative aspect: North Meets hydric soil criteria: No

**Rubicon soils** 

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

# 1444432—Gogebic fine sandy loam, 1 to 6 percent slopes, very stony

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 1,295 to 1,595 feet

Mean annual precipitation: 30 to 34 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 100 to 120 days

**Map Unit Composition** 

Gogebic and similar soils: 85 percent Dissimilar minor components: 15 percent

#### **Description of the Gogebic Soil**

#### **Taxonomic Classification**

Coarse-loamy, isotic, frigid Alfic Oxyaquic Fragiorthods

Setting

Landform: End moraines

Landform position (two-dimensional): Shoulder

Slope range: 1 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: High

Parent material: Modified loamy eolian deposits and underlying loamy till

Restrictive feature(s): Fragipan at a depth of 18 to 36 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.9 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: Sugar maple and hazelnut

#### **Typical Profile**

Oi—0 to 1 inch; slightly decomposed plant material

A—1 to 5 inches; fine sandy loam
E—5 to 7 inches; fine sandy loam
Bhs—7 to 17 inches; fine sandy loam
Bs—17 to 26 inches; sandy loam
E/Bx—26 to 36 inches; sandy loam
B/Ex—36 to 53 inches; fine sandy loam
BC—53 to 71 inches; fine sandy loam
C—71 to 80 inches; fine sandy loam

## **Minor Components**

#### Tula soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

#### Morganiake soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## 1444435—losco loamy sand, 0 to 4 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 32 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

losco and similar soils: 85 percent Dissimilar minor components: 15 percent

#### **Description of the losco Soil**

#### **Taxonomic Classification**

Sandy over loamy, mixed, active, frigid Argic Endoaquods

#### Setting

Landform: Lake plains, ground moraines, and outwash plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 4 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy lacustrine or outwash deposits overlying loamy lacustrine or till

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 6 inches (see table 19)

Drainage class: Somewhat poorly drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 23

Available water capacity: Moderate (about 8.1 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: Sugar maple and eastern white pine

### **Typical Profile**

Ap—0 to 7 inches; loamy sand E—7 to 9 inches; loamy sand Bhs—9 to 11 inches; loamy sand Bs—11 to 28 inches; sand

E'—28 to 34 inches; sand

2Bt—34 to 40 inches; silty clay loam 2C—40 to 60 inches; silty clay loam

### **Minor Components**

# Allendale soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Morganlake soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### **Tonkey soils**

Percent of map unit: 5 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 1444457—Redrim very cobbly sand, 0 to 6 percent slopes, very stony

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 28 to 33 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

### **Map Unit Composition**

Redrim and similar soils: 85 percent Dissimilar minor components: 15 percent

### **Description of the Redrim Soil**

### **Taxonomic Classification**

Sandy-skeletal, mixed, frigid Entic Lithic Haplorthods

### Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy-skeletal beach deposits or residuum from sandstone, or both

Restrictive feature(s): Lithic bedrock at a depth of 10 to 20 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

### Vegetation

Existing plants: Bigleaf aster, yellow bluebeadlily, eastern teaberry, clubmoss, Canada beadruby, western brackenfern, starflower, and mapleleaf viburnum

# **Typical Profile**

Oe—0 to 1 inch; moderately decomposed plant material Oa—1 to 3 inches; highly decomposed plant material

E—3 to 11 inches; very cobbly sand

Bs—11 to 18 inches; very cobbly loamy sand 2R—18 to 80 inches; unweathered bedrock

### **Minor Components**

### **Brownstone soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### **Deerton soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### Abbaye soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

### Zeba soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1444459—Zeba sandy loam, 0 to 6 percent slopes, very stony

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

### **Map Unit Composition**

Zeba and similar soils: 90 percent Dissimilar minor components: 10 percent

# **Description of the Zeba Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Argic Endoaquods

### Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Loamy glacial drift underlain by sandstone bedrock Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 9.4 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Balsam fir, white baneberry, red maple, wild sarsaparilla, yellow birch, sedge, yellow bluebeadlily, bunchberry dogwood, threeleaf goldthread, spinulose woodfern, shining clubmoss, Canada beadruby, mountain woodsorrel, and American starflower

# **Typical Profile**

A—0 to 2 inches; sandy loam E—2 to 5 inches; sandy loam Bs—5 to 13 inches; sandy loam E´—13 to 21 inches; sandy loam B/E—21 to 33 inches; sandy loam

2R—33 to 80 inches; unweathered bedrock

### **Minor Components**

# Abbaye soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### **Deerton soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444460—Abbaye-Lapoin complex, 0 to 6 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 36 to 43 degrees F

Frost-free period: 90 to 120 days

# **Map Unit Composition**

Abbaye and similar soils: 55 percent Lapoin and similar soils: 40 percent Dissimilar minor components: 5 percent

### **Description of the Abbaye Soil**

### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex

Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Till underlain by sandstone bedrock

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.7 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Balsam fir, sugar maple, yellow birch, sedge, yellow bluebeadlily, spinulose woodfern, shining clubmoss, Canada beadruby, hairy Solomon's seal, red elderberry, feather Solomon's seal, twistedstalk, and American starflower

### **Typical Profile**

Oi—0 to 2 inches; slightly decomposed plant material

A—2 to 4 inches; sandy loam E—4 to 13 inches; loamy sand Bs—13 to 25 inches; sandy loam B/E—25 to 32 inches; sandy loam

2R-32 to 80 inches; unweathered bedrock

### **Description of the Lapoin Soil**

### **Taxonomic Classification**

Fine, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Medium

Parent material: Loamy alluvium and clayey till and underlying loamy till Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: Low (about 5.9 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Canada beadruby, Clayton's sweetroot, western brackenfern, and mapleleaf viburnum

# **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E—1 to 4 inches; loam Bs—4 to 7 inches; loam 2B/E—7 to 19 inches; clay 2Bt—19 to 34 inches; clay

3C-34 to 39 inches; sandy loam

4R—39 to 80 inches; unweathered bedrock

### **Minor Components**

### Zeba soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444461—Abbaye-Zeba complex, 0 to 6 percent slopes, very stony

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

### **Map Unit Composition**

Abbaye and similar soils: 55 percent Zeba and similar soils: 40 percent Dissimilar minor components: 5 percent

### **Description of the Abbaye Soil**

### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent

Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Till underlain by sandstone bedrock

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.7 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

### Vegetation

Existing plants: Balsam fir, sugar maple, yellow birch, sedge, yellow bluebeadlily, spinulose woodfern, shining clubmoss, Canada beadruby, hairy Solomon's seal, red elderberry, feather Solomon's seal, twistedstalk, and American starflower

### **Typical Profile**

Oi-0 to 2 inches; slightly decomposed plant material

A—2 to 4 inches; sandy loam E—4 to 13 inches; loamy sand Bs—13 to 25 inches; sandy loam B/E—25 to 32 inches; sandy loam

2R-32 to 80 inches; unweathered bedrock

### **Description of the Zeba Soil**

### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Argic Endoaquods

# Setting

Landform: Hills

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Loamy glacial drift underlain by sandstone bedrock Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 12 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: High (about 9.4 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Balsam fir, white baneberry, red maple, wild sarsaparilla, yellow birch, sedge, yellow bluebeadlily, bunchberry dogwood, threeleaf goldthread, spinulose woodfern, shining clubmoss, Canada beadruby, mountain woodsorrel, and American starflower

# **Typical Profile**

A—0 to 2 inches; sandy loam E—2 to 5 inches; sandy loam Bs—5 to 13 inches; sandy loam E´—13 to 21 inches; sandy loam B/E—21 to 33 inches; sandy loam

2R—33 to 80 inches; unweathered bedrock

### **Minor Components**

### Lapoin soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444477—Cublake-Croswell-Ashwabay complex, 0 to 6 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,150 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 140 days

### **Map Unit Composition**

Cublake and similar soils: 35 percent Croswell and similar soils: 20 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 25 percent

### **Description of the Cublake Soil**

### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

### Setting

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash underlain by stratified silty, loamy, and sandy

glaciofuvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.4 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, starry false Solomon's seal, and lowbush blueberry

### **Typical Profile**

A—0 to 3 inches; sand E—3 to 4 inches; sand Bs—4 to 23 inches; sand BC—23 to 32 inches; sand C1—32 to 40 inches; sand

C2-40 to 48 inches; stratified fine sand to very fine sand

2C3—48 to 60 inches; stratified very fine sandy loam to silt loam

# **Description of the Croswell Soil**

### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

### Setting

Landform: Outwash plains, stream terraces, lake plains, and lake terraces

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy glacial drift

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

# Vegetation

*Existing plants:* Kinnikinnick, swordfern, trailing arbutus, eastern teaberry, twinflower, pin cherry, brackenfern, thimbleberry, starflower, and blueberry

# **Typical Profile**

A—0 to 1 inch; sand E—1 to 7 inches; sand Bs—7 to 16 inches; sand BC—16 to 39 inches; sand C—39 to 60 inches; sand

### **Description of the Ashwabay Soil**

### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

# Setting

Landform: Outwash plains, lake plains, and ground moraines

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

### **Minor Components**

### **Rubicon soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Sayner soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### Sultz soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444478—Cublake-Croswell-Ashwabay complex, 6 to 15 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,150 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 140 days

### **Map Unit Composition**

Cublake and similar soils: 35 percent Croswell and similar soils: 20 percent

Ashwabay and similar soils: 20 percent Dissimilar minor components: 25 percent

### **Description of the Cublake Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

### Setting

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash underlain by stratified silty, loamy, and sandy

glaciofuvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.4 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, starry false Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 3 inches; sand E—3 to 4 inches; sand Bs—4 to 23 inches; sand BC—23 to 32 inches; sand C1—32 to 40 inches; sand

C2—40 to 48 inches; stratified fine sand to very fine sand

2C3—48 to 60 inches; stratified very fine sandy loam to silt loam

# **Description of the Croswell Soil**

### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

### Setting

Landform: Outwash plains, stream terraces, lake plains, and lake terraces Landform position (two-dimensional): Backslope

Slope range: 6 to 12 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy glacial drift

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.1 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

### Vegetation

Existing plants: Kinnikinnick, swordfern, trailing arbutus, eastern teaberry, twinflower, pin cherry, brackenfern, thimbleberry, starflower, and blueberry

# **Typical Profile**

A—0 to 1 inch; sand E—1 to 7 inches; sand Bs—7 to 16 inches; sand BC—16 to 39 inches; sand C—39 to 60 inches; sand

### **Description of the Ashwabay Soil**

### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None

Frequency of ponding: None

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

# **Minor Components**

### **Rubicon soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Sayner soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Sultz soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444479—Morganiake loamy sand, 0 to 6 percent slopes

### Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 695 to 1,095 feet

Mean annual precipitation: 28 to 33 inches

Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

### **Map Unit Composition**

Morganlake and similar soils: 85 percent Dissimilar minor components: 15 percent

### **Description of the Morganlake Soil**

### **Taxonomic Classification**

Sandy over loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Moraines

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash and underlying loamy till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 15

Available water capacity: Moderate (about 7.9 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3s

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Wild sarsaparilla, common ladyfern, beaked hazelnut, lily-of-the-valley, Austrian woodfern, and western brackenfern

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 8 inches; loamy sand Bs—8 to 26 inches; loamy fine sand Bw—26 to 31 inches; loamy fine sand 2B/E—31 to 40 inches; silty clay loam 2C—40 to 60 inches; silty clay loam

# **Minor Components**

### losco soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Kellogg soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Menominee soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444480—Morganiake loamy sand, 6 to 15 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 695 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

### **Map Unit Composition**

Morganlake and similar soils: 85 percent Dissimilar minor components: 15 percent

# **Description of the Morganlake Soil**

### **Taxonomic Classification**

Sandy over loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Moraines

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash and underlying loamy till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 15

Available water capacity: Moderate (about 7.9 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Wild sarsaparilla, common ladyfern, beaked hazelnut, lily-of-the-valley, Austrian woodfern, and western brackenfern

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 8 inches; loamy sand Bs—8 to 26 inches; loamy fine sand Bw—26 to 31 inches; loamy fine sand 2B/E—31 to 40 inches; silty clay loam 2C—40 to 60 inches; silty clay loam

# **Minor Components**

### losco soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Kellogg soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### Menominee soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444481—Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

# **Map Unit Composition**

Kellogg and similar soils: 35 percent Allendale and similar soils: 25 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 20 percent

### **Description of the Kellogg Soil**

# **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

# Setting

Landform: Lake plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy lacustrine or outwash sediments and underlying clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.1 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3s

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

### **Typical Profile**

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 6 inches; sand Bs—6 to 26 inches; sand 2B/E—26 to 29 inches; silty clay 2Bt—29 to 40 inches; silty clay 2C—40 to 80 inches; silty clay

### **Description of the Allendale Soil**

### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

# Setting

Landform: Lake terraces, outwash plains, ground moraines, and lake plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison ivy, American elm, and violet

### **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand
Bhs—10 to 13 inches; sand
Bs—13 to 26 inches; sand
E'—26 to 28 inches; sand
2Bt—28 to 34 inches; clay
2C—34 to 60 inches; clay

### **Description of the Ashwabay Soil**

### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Outwash plains, lake plains, and ground moraines

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

### **Minor Components**

# **Portwing soils**

Percent of map unit: 8 percent Representative aspect: North Meets hydric soil criteria: No

### **Cublake soils**

Percent of map unit: 7 percent Representative aspect: North Meets hydric soil criteria: No

# Wakeley soils

Percent of map unit: 5 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 1444482—Kellogg-Allendale-Ashwabay complex, 0 to 15 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

### **Map Unit Composition**

Kellogg and similar soils: 40 percent Allendale and similar soils: 25 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 15 percent

### **Description of the Kellogg Soil**

### **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Sandy lacustrine or outwash sediments and underlying clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.1 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

*Existing plants:* Serviceberry, sedge, lily-of-the-valley, hawthorn, strawberry, eastern teaberry, western brackenfern, starflower, and blueberry

### **Typical Profile**

Oe-0 to 2 inches; moderately decomposed plant material

E—2 to 6 inches; sand Bs—6 to 26 inches; sand 2B/E—26 to 29 inches; silty clay 2Bt—29 to 40 inches; silty clay 2C—40 to 80 inches; silty clay

# **Description of the Allendale Soil**

### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

### Setting

Landform: Lake terraces, outwash plains, ground moraines, and lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 12 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison

ivy, American elm, and violet

# **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand Bhs—10 to 13 inches; sand Bs—13 to 26 inches; sand E′—26 to 28 inches; sand 2Bt—28 to 34 inches; clay 2C—34 to 60 inches; clay

### **Description of the Ashwabay Soil**

### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Outwash plains, lake plains, and ground moraines
Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline

Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: B

### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

# **Minor Components**

### **Portwing soils**

Percent of map unit: 7 percent Representative aspect: North Meets hydric soil criteria: No

### **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Wakeley soils

Percent of map unit: 3 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 1444486—Sedgwick-Munuscong complex, 0 to 6 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 60 to 120 days

# **Map Unit Composition**

Sedgwick and similar soils: 50 percent Munuscong and similar soils: 30 percent Dissimilar minor components: 20 percent

# **Description of the Sedgwick Soil**

### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaguods

### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very high

Parent material: Loamy alluvium and underlying clayey till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: High (about 9.8 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

# Vegetation

Existing plants: Speckled alder, threeseeded sedge, yellow bluebeadlily, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, willow, and blueberry

### **Typical Profile**

A—0 to 5 inches; sandy loam E—5 to 8 inches; loamy sand Bs—8 to 16 inches; sandy loam 2B/E—16 to 19 inches; clay 2B—19 to 53 inches; clay 2Btk—53 to 80 inches; silty clay

### **Description of the Munuscong Soil**

### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, nonacid, frigid Mollic Epiaquepts

### Setting

Landform: Lake plains and ground moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Medium

Parent material: Loamy glaciofluvial deposits over calcareous clayey materials

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Poorly drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 20

Available water capacity: Moderate (about 8.3 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: B/D

### Vegetation

Existing plants: Speckled alder, willow, eastern hemlock, and American elm

# **Typical Profile**

A—0 to 8 inches; fine sandy loam Bg—8 to 30 inches; sandy loam 2C—30 to 60 inches; silty clay

### **Minor Components**

### Allendale soils

Percent of map unit: 8 percent Representative aspect: North Meets hydric soil criteria: No

### Superior soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### Herbster soils

Percent of map unit: 4 percent Representative aspect: North Meets hydric soil criteria: No

### **Pickford soils**

Percent of map unit: 3 percent

Landform: Depressions and drainageways

Representative aspect: North Meets hydric soil criteria: Yes

# 1444487—Superior-Sedgwick complex, 0 to 6 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

### **Map Unit Composition**

Superior and similar soils: 50 percent Sedgwick and similar soils: 30 percent Dissimilar minor components: 20 percent

# **Description of the Superior Soil**

### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Settino

Landform: Lake plains

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very high

Parent material: Loamy water-laid deposits and underlying clayey lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 13

Available water capacity: Moderate (about 6.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3e

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Bigleaf aster, yellow bluebeadlily, bunchberry dogwood, fragrant bedstraw, American fly honeysuckle, Canada beadruby, blackberry, American starflower, and blueberry

# **Typical Profile**

A—0 to 3 inches; fine sandy loam E—3 to 6 inches; sandy loam

Bs—6 to 14 inches; sandy loam 2B/E—14 to 19 inches; clay 2Bt—19 to 26 inches; clay 2C—26 to 60 inches; clay

### **Description of the Sedgwick Soil**

### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaquods

### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very high

Parent material: Loamy alluvium and underlying clayey till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: High (about 9.8 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

### Vegetation

Existing plants: Speckled alder, threeseeded sedge, yellow bluebeadlily, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, willow, and blueberry

# **Typical Profile**

A—0 to 5 inches; loamy sand E—5 to 8 inches; loamy sand Bs—8 to 16 inches; sandy loam 2B/E—16 to 19 inches; clay 2Bt—19 to 53 inches; clay 2Btk—53 to 80 inches; silty clay

### **Minor Components**

### Allendale soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

### **Portwing soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### Munuscong soils

Percent of map unit: 3 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

#### Herbster soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1444488—Superior-Sedgwick complex, 6 to 15 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

### **Map Unit Composition**

Superior and similar soils: 50 percent Sedgwick and similar soils: 30 percent Dissimilar minor components: 20 percent

### **Description of the Superior Soil**

### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Very high

Parent material: Loamy water-laid deposits and underlying clayey lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Moderately well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 13

Available water capacity: Moderate (about 6.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No Hydrologic soil group: C

# Vegetation

Existing plants: Bigleaf aster, yellow bluebeadlily, bunchberry dogwood, fragrant bedstraw, American fly honeysuckle, Canada beadruby, blackberry, American starflower, and blueberry

### **Typical Profile**

A—0 to 3 inches; fine sandy loam E—3 to 6 inches; sandy loam Bs—6 to 14 inches; sandy loam 2B/E—14 to 19 inches; clay 2Bt—19 to 26 inches; clay 2C—26 to 60 inches; clay

# **Description of the Sedgwick Soil**

### **Taxonomic Classification**

Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaquods

#### Setting

Landform: Till plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 15 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Very high

Parent material: Loamy alluvium and underlying clayey till Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: High (about 9.8 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: D

### Vegetation

Existing plants: Speckled alder, threeseeded sedge, yellow bluebeadlily, bunchberry dogwood, water horsetail, eastern teaberry, fragrant bedstraw, western brackenfern, willow, and blueberry

### **Typical Profile**

A—0 to 5 inches; loamy sand E—5 to 8 inches; loamy sand Bs—8 to 16 inches; sandy loam 2B/E—16 to 19 inches; clay 2Bt—19 to 53 inches; clay 2Btk—53 to 80 inches; silty clay

# **Minor Components**

# Kellogg soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

# Cornucopia soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

### Allendale soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

#### Lerch soils

Percent of map unit: 2 percent

Landform: Drainageways and depressions

Representative aspect: North Meets hydric soil criteria: Yes

# 1444489—Sultz-Ashwabay-Rubicon complex, 15 to 45 percent slopes

# **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,950 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

### **Map Unit Composition**

Sultz and similar soils: 35 percent Ashwabay and similar soils: 25 percent Rubicon and similar soils: 20 percent Dissimilar minor components: 20 percent

### **Description of the Sultz Soil**

### **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

### Setting

Landform: Outwash plains, outwash terraces, lake plains, and lake terraces

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash underlain by stratified loamy or loamy and sandy

alluvium or lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Moderate (about 6.3 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

### Vegetation

Existing plants: Spreading dogbane, bigleaf aster, American hazelnut, eastern teaberry, clubmoss, partridgeberry, western brackenfern, starry false Solomon's seal, and blueberry

# **Typical Profile**

Oa-0 to 2 inches; highly decomposed plant material

E—2 to 6 inches; sand Bs—6 to 18 inches; sand BC—18 to 25 inches; sand C—25 to 43 inches; sand

2C-43 to 60 inches; stratified sand to fine sand to loamy sand to very fine sandy loam

### **Description of the Ashwabay Soil**

### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

#### Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 30 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

### Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2-62 to 80 inches; stratified clay to silt to sand

# **Description of the Rubicon Soil**

### **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

### Setting

Landform: Outwash plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Sandy deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 3.4 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

### Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, Pennsylvania sedge, beaked hazelnut, eastern teaberry, sweet fern, pin cherry, western brackenfern, and blueberry

# **Typical Profile**

A—0 to 1 inch; sand E—1 to 6 inches; sand B—6 to 18 inches; sand BC—18 to 36 inches; sand C—36 to 60 inches; sand

### **Minor Components**

# Sayner soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

### **Cublake soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# **Manistee soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444492—Manistee-Kellogg-Ashwabay complex, 15 to 45 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,400 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 140 days

# **Map Unit Composition**

Manistee and similar soils: 40 percent Kellogg and similar soils: 30 percent Ashwabay and similar soils: 20 percent Dissimilar minor components: 10 percent

# **Description of the Manistee Soil**

### **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Haplorthods

### Setting

Landform: Lake plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

# **Properties and Qualities**

Runoff: Low

Parent material: Sandy lacustrine and outwash sediments underlain by clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 15

Available water capacity: Low (about 5.9 inches)

### **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

# Vegetation

Existing plants: Sugar maple, eastern white pine, and eastern hemlock

# **Typical Profile**

A—0 to 3 inches; sand E—3 to 11 inches; sand Bs—11 to 28 inches; sand E′—28 to 30 inches; sand 2Bt—30 to 38 inches; clay 2C—38 to 60 inches; clay

### **Description of the Kellogg Soil**

### **Taxonomic Classification**

Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods

# Setting

Landform: Lake terraces

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 30 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North

Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Low

Parent material: Sandy lacustrine or outwash sediments and underlying clayey

lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 3

Available water capacity: High (about 10.1 inches)

# **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: C

### Vegetation

Existing plants: Serviceberry, sedge, lily-of-the-valley, hawthorn, strawberry, eastern teaberry, western brackenfern, starflower, and blueberry

# **Typical Profile**

Oe—0 to 2 inches; moderately decomposed plant material

E—2 to 6 inches; sand Bs—6 to 26 inches; sand 2B/E—26 to 29 inches; silty clay 2Bt—29 to 40 inches; silty clay 2C—40 to 80 inches; silty clay

# **Description of the Ashwabay Soil**

### **Taxonomic Classification**

Sandy, isotic, frigid Alfic Oxyaquic Haplorthods

### Setting

Landform: Outwash plains, lake plains, and ground moraines Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 45 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

### **Properties and Qualities**

Runoff: Low

Parent material: Sandy outwash or beach deposits underlain by clayey till or lacustrine deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 30 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

# Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, feather Solomon's seal, and lowbush blueberry

# **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 5 inches; sand Bhs—5 to 12 inches; sand Bs—12 to 32 inches; sand Bw—32 to 45 inches; sand 2Bt1—45 to 62 inches; clay

2Bt2—62 to 80 inches; stratified clay to silt to sand

# **Minor Components**

### Superior soils

Percent of map unit: 4 percent Representative aspect: North Meets hydric soil criteria: No

# Cornucopia soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

### Sultz soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

# 1444506—Keweenaw, stony-Rubicon complex, 0 to 6 percent slopes

### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,800 feet

Mean annual precipitation: 26 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 80 to 140 days

### **Map Unit Composition**

Keweenaw and similar soils: 60 percent

Rubicon and similar soils: 30 percent Dissimilar minor components: 10 percent

## **Description of the Keweenaw Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Alfic Haplorthods

#### Setting

Landform: Disintegration moraines

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Low

Parent material: Sandy till

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.8 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Large-leaved aster, blueberry, decomposition brackenfern, juneberry, lily-of-the-valley, and bellwort

## **Typical Profile**

A—0 to 2 inches; loamy sand E—2 to 4 inches; loamy sand

Bs1,Bs2—4 to 16 inches; loamy sand Bs3—16 to 20 inches; loamy sand E´—20 to 27 inches; loamy sand E/B—27 to 43 inches; sand B/E—43 to 75 inches; loamy sand

C-75 to 80 inches; loamy sand

**Description of the Rubicon Soil** 

## **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

## Setting

Landform: Disintegration moraines

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Outwash sands

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, Pennsylvania sedge, beaked hazelnut, eastern teaberry, sweet fern, pin cherry, western brackenfern, and blueberry

## **Typical Profile**

A—0 to 1 inch; sand E—1 to 6 inches; sand Bs—6 to 18 inches; sand BC—18 to 36 inches; sand C—36 to 60 inches; sand

## **Minor Components**

## **Cublake soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

# 1444507—Keweenaw, stony-Rubicon complex, 6 to 15 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,800 feet

Mean annual precipitation: 26 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 80 to 140 days

## **Map Unit Composition**

Keweenaw and similar soils: 60 percent Rubicon and similar soils: 30 percent Dissimilar minor components: 10 percent

## **Description of the Keweenaw Soil**

## **Taxonomic Classification**

Sandy, mixed, frigid Alfic Haplorthods

#### Setting

Landform: Disintegration moraines

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Medium

Parent material: Sandy till

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.8 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Large-leaved aster, blueberry, decomposition brackenfern, juneberry,

lily-of-the-valley, and bellwort

## **Typical Profile**

A—0 to 2 inches; loamy sand E—2 to 4 inches; loamy sand

Bs1,Bs2—4 to 16 inches; loamy sand Bs3—16 to 20 inches; loamy sand E´—20 to 27 inches; loamy sand E/B—27 to 43 inches; sand

B/E—43 to 75 inches; loamy sand C—75 to 80 inches; loamy sand

## **Description of the Rubicon Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Entic Haplorthods

## Setting

Landform: Disintegration moraines

Landform position (two-dimensional): Summit

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Outwash sands

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Wild sarsaparilla, bigleaf aster, Pennsylvania sedge, beaked hazelnut, eastern teaberry, sweet fern, pin cherry, western brackenfern, and blueberry

## **Typical Profile**

A—0 to 1 inch; sand E—1 to 6 inches; sand Bs—6 to 18 inches; sand BC—18 to 36 inches; sand C—36 to 60 inches; sand

## **Minor Components**

## **Cublake soils**

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

# 1444585—Meehan sand, beaches, 0 to 2 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 665 to 1,950 feet

Mean annual precipitation: 25 to 35 inches Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 90 to 140 days

## **Map Unit Composition**

Meehan, beaches and similar soils: 90 percent Dissimilar minor components: 10 percent

#### Description of the Meehan, Beaches Soil

#### **Taxonomic Classification**

Mixed, frigid Aquic Udipsamments

#### Setting

Landform: Beach ridges

Landform position (two-dimensional): Footslope

Slope range: 0 to 2 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Parent material: Sandy alluvium

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 6 inches (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.2 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4w

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Leadplant, field pussytoes, Pennsylvania sedge, American hazelnut, Richards comandra, and flowering spurge

## **Typical Profile**

A—0 to 4 inches; sand Bw—4 to 29 inches; sand C—29 to 60 inches; sand

#### **Minor Components**

## Newson, beaches soils

Percent of map unit: 5 percent Landform: Depressions Representative aspect: North Meets hydric soil criteria: Yes

## Wurtsmith, beaches soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1444586—Wurtsmith sand, beaches, 0 to 3 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,400 feet

Mean annual precipitation: 24 to 30 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 130 days

#### **Map Unit Composition**

Wurtsmith, beaches and similar soils: 90 percent Dissimilar minor components: 10 percent

## **Description of the Wurtsmith, Beaches Soil**

## **Taxonomic Classification**

Mixed, frigid Oxyaquic Udipsamments

#### Setting

Landform: Dunes and beach ridges

Landform position (two-dimensional): Footslope

Slope range: 0 to 3 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Parent material: Sandy outwash and lacustrine deposits Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 24 inches (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.7 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Serviceberry, bigleaf aster, strawberry, eastern teaberry, Canada beadruby, western brackenfern, blackberry, American starflower, and velvetleaf huckleberry

## **Typical Profile**

Oe—0 to 1 inch; moderately decomposed plant material

E—1 to 4 inches; sand Bw—4 to 24 inches; sand

BC—24 to 48 inches; sand C—48 to 80 inches; sand

## **Minor Components**

## Grayling, beaches soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Meehan, beaches soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## 1444587—Grayling sand, beaches, 2 to 12 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,400 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 90 to 130 days

## **Map Unit Composition**

Grayling, beaches and similar soils: 95 percent Dissimilar minor components: 5 percent

## Description of the Grayling, Beaches Soil

#### **Taxonomic Classification**

Isotic, frigid Typic Udipsamments

#### Setting

Landform: Beach ridges

Landform position (two-dimensional): Shoulder and backslope

Slope range: 2 to 12 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Parent material: Sandy deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 8

Available water capacity: Low (about 3.5 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Eastern teaberry, sweet fern, American starflower, and blueberry

## **Typical Profile**

A—0 to 3 inches; sand Bw—3 to 15 inches; sand BC—15 to 23 inches; sand C—23 to 60 inches; sand

## **Minor Components**

## Wurtsmith, beaches soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## 1529830—Meehan sand, beaches, 0 to 2 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 665 to 1,950 feet

Mean annual precipitation: 25 to 35 inches Mean annual air temperature: 37 to 45 degrees F

Frost-free period: 90 to 140 days

#### **Map Unit Composition**

Meehan, beaches and similar soils: 90 percent Dissimilar minor components: 10 percent

#### Description of the Meehan, Beaches Soil

## **Taxonomic Classification**

Mixed, frigid Aquic Udipsamments

#### Setting

Landform: Beach ridges

Landform position (two-dimensional): Footslope

Slope range: 0 to 2 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Parent material: Sandy alluvium

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: About 6 inches (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: Low (about 1.5 LEP)

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.2 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4w

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Leadplant, field pussytoes, Pennsylvania sedge, American hazelnut, Richards comandra, and flowering spurge

## **Typical Profile**

A—0 to 4 inches; sand Bw—4 to 29 inches; sand C—29 to 60 inches; sand

## **Minor Components**

## Newson, beaches soils

Percent of map unit: 5 percent

Landform: Depressions
Representative aspect: North
Meets hydric soil criteria: Yes

## Wurtsmith, beaches soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1700372—Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes

## **Map Unit Setting**

Major land resource areas (MLRAs): 90A—Wisconsin and Minnesota Thin Loess and Till, Northern Part; 91B—Wisconsin and Minnesota Sandy Outwash; 92—Superior Lake Plain; 93B—Superior Stony and Rocky Loamy Plains and Hills, Eastern Part

Elevation: 600 to 1,400 feet

Mean annual precipitation: 24 to 45 inches Mean annual air temperature: 36 to 45 degrees F

Frost-free period: 60 to 140 days

## **Map Unit Composition**

Loxley and similar soils: 40 percent Beseman and similar soils: 30 percent Dawson and similar soils: 28 percent Dissimilar minor components: 2 percent

## **Description of the Loxley Soil**

## **Taxonomic Classification**

Dysic, frigid Typic Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Landform position (two-dimensional): Toeslope

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material more than 51 inches thick

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Occasional
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Salinity maximum: Not saline

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 26.5 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

Sodicity maximum: Not sodic

## **Typical Profile**

Oe—0 to 13 inches; mucky peat Oa—13 to 60 inches; muck

#### **Description of the Beseman Soil**

## **Taxonomic Classification**

Loamy, mixed, dysic, frigid Terric Haplosaprists

#### Settino

Landform: Depressions on disintegration moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Herbaceous organic material 16 to 51 inches thick over loamy till

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Occasional
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 18.2 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### **Typical Profile**

Oa—0 to 36 inches; muck Cg—36 to 60 inches; loam

#### **Description of the Dawson Soil**

#### **Taxonomic Classification**

Sandy or sandy-skeletal, mixed, dysic, frigid Terric Haplosaprists

#### Setting

Landform: Depressions on disintegration moraines Landform position (two-dimensional): Toeslope

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sphagnum moss and herbaceous organic material 16 to 51 inches

thick over sandy or sandy and gravelly deposits Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Occasional
Depth to water table: At the soil surface
Drainage class: Very poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 18.2 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

## **Typical Profile**

Oi—0 to 8 inches; peat Oa—8 to 38 inches; muck A—38 to 40 inches; silt loam 2C—40 to 60 inches; sand

## **Minor Components**

#### Uskabwanka soils

Percent of map unit: 2 percent

Landform: Depressions on disintegration moraines

Representative aspect: North Meets hydric soil criteria: Yes

## 1700373—Rifle peat, 0 to 1 percent slopes

#### **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 33 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 60 to 110 days

## **Map Unit Composition**

Rifle and similar soils: 90 percent

Dissimilar minor components: 10 percent

## **Description of the Rifle Soil**

## **Taxonomic Classification**

Euic, frigid Typic Haplohemists

#### Setting

Landform: Depressions on moraines, depressions on outwash plains, and depressions

on lake plains

Slope range: 0 to 1 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Organic deposits more than 51 inches thick Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None
Frequency of ponding: Frequent
Depth to water table: At the soil surface
Drainage class: Very poorly drained
Salinity maximum: Not saline
Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very high (about 30.3 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Balsam fir, sedge, and eastern arborvitae

## **Typical Profile**

Oi-0 to 4 inches; peat

Oe-4 to 60 inches; mucky peat

## **Minor Components**

#### **Dawson soils**

Percent of map unit: 5 percent

*Landform:* Depressions on lake plains, depressions on moraines, bogs on lake plains, bogs on moraines, depressions on outwash plains, and bogs on outwash plains

Representative aspect: North Meets hydric soil criteria: Yes

## Loxley soils

Percent of map unit: 5 percent

Landform: Depressions on lake plains, depressions on moraines, bogs on lake plains, bogs on moraines, depressions on outwash plains, and bogs on outwash plains

Representative aspect: North Meets hydric soil criteria: Yes

# 1700374—Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,695 feet

Mean annual precipitation: 27 to 34 inches Mean annual air temperature: 39 to 46 degrees F

Frost-free period: 60 to 120 days

## **Map Unit Composition**

Allendale and similar soils: 35 percent Wakeley and similar soils: 30 percent Kinross and similar soils: 20 percent Dissimilar minor components: 15 percent

## **Description of the Allendale Soil**

#### **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods

#### Setting

Landform: Lake terraces, outwash plains, ground moraines, and lake plains

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy sediments and underlying clayey lacustrine or till deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 6 inches, perched (see table 19)

Drainage class: Somewhat poorly drained Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

#### Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Calcium carbonate equivalent (maximum weight percentage): 5

Available water capacity: Low (about 5.5 inches)

#### **Interpretive Groups**

Land capability subclass (nonirrigated): 3w

Meets hydric soil criteria: No Hydrologic soil group: C

## Vegetation

Existing plants: Speckled alder, bunchberry dogwood, gray dogwood, eastern poison ivy, American elm, and violet

## **Typical Profile**

A-0 to 3 inches; loamy fine sand

E—3 to 10 inches; sand Bhs—10 to 13 inches; sand Bs—13 to 26 inches; sand E′—26 to 28 inches; sand 2Bt—28 to 34 inches; clay 2C—34 to 60 inches; clay

#### **Description of the Wakeley Soil**

## **Taxonomic Classification**

Sandy over clayey, mixed, semiactive, nonacid, frigid Aeric Epiaquents

#### Setting

Landform: Outwash plains and lake plains Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash and lacustrine material underlain by clayey lacustrine

deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Very poorly drained

Shrink-swell potential: High (about 7.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 19

Available water capacity: Moderate (about 8.9 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: B/D

## Vegetation

Existing plants: Speckled alder, marsh marigold, redosier dogwood, threeleaf

goldthread, water horsetail, and eastern arborvitae

## **Typical Profile**

Oa—0 to 4 inches; muck C—4 to 23 inches; loamy sand Cg—23 to 28 inches; loamy sand

2C-28 to 80 inches; clay

## **Description of the Kinross Soil**

## **Taxonomic Classification**

Sandy, mixed, frigid Typic Endoaquods

## Setting

Landform: Stream terraces, outwash plains, and lake plains

Landform position (two-dimensional): Toeslope

Slope range: 0 to 2 percent Down-slope shape: Concave Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Negligible

Parent material: Glaciofluvial material

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: Frequent

Water table (depth, kind): At the soil surface, perched (see table 19)

Drainage class: Very poorly drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.8 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6w

Meets hydric soil criteria: Yes Hydrologic soil group: A/D

#### Vegetation

Existing plants: Balsam fir, speckled alder, jack pine, eastern arborvitae, eastern

hemlock, and blueberry

## **Typical Profile**

Oa—0 to 6 inches; muck E—6 to 10 inches; sand Bhs—10 to 12 inches; sand Bs—12 to 24 inches; sand BC—24 to 42 inches; sand C—42 to 60 inches; sand

## **Minor Components**

#### Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Sedgwick soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Tawas soils

Percent of map unit: 5 percent Landform: Depressions Representative aspect: North Meets hydric soil criteria: Yes

# 1702605—Menominee loamy sand, 15 to 30 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 28 to 32 inches Mean annual air temperature: 41 to 45 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Menominee and similar soils: 85 percent Dissimilar minor components: 15 percent

## **Description of the Menominee Soil**

## **Taxonomic Classification**

Sandy over loamy, mixed, active, frigid Alfic Haplorthods

## Setting

Landform: End moraines, ground moraines, lake plains, and outwash plains

Landform position (two-dimensional): Shoulder and backslope

Slope range: 15 to 30 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Medium

Parent material: Sandy glaciofluvial material over loamy till or lacustrine sediments

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Moderate (about 4.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 15

Available water capacity: High (about 10.7 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Sugar maple, serviceberry, silky dogwood, eastern teaberry, American witchhazel, Canada beadruby, eastern white pine, hairy Solomon's seal, brackenfern, blackberry, blueberry, and mapleleaf viburnum

## **Typical Profile**

A—0 to 4 inches; loamy sand E—4 to 7 inches; sand Bs—7 to 23 inches; sand 2B/E—23 to 39 inches; clay loam 2Bt—39 to 59 inches; clay loam 2C—59 to 80 inches; loam

## **Minor Components**

## Ashwabay soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

#### Morganlake soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1702606—Deerton-Brownstone complex, 0 to 6 percent slopes, very stony

## Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Deerton and similar soils: 50 percent Brownstone and similar soils: 40 percent Dissimilar minor components: 10 percent

## **Description of the Deerton Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Typic Haplorthods

## Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash beach deposits or sandy residuum from sandstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.6 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Balsam fir, sugar maple, sedge, spinulose woodfern, trailing arbutus, eastern teaberry, Canada beadruby, blackberry, thimbleberry, and American starflower

## **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E-1 to 9 inches; sand

Bhs—9 to 10 inches; loamy sand Bs—10 to 25 inches; sand

2Cr—25 to 39 inches; weathered bedrock 2R—39 to 80 inches; unweathered bedrock

## **Description of the Brownstone Soil**

## **Taxonomic Classification**

Sandy-skeletal, mixed, frigid Typic Haplorthods

## Setting

Landform: Hills

Landform position (two-dimensional): Summit

Slope range: 0 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy-skeletal beach deposits or residuum from sandstone, or both

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 3.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 6s

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Aster, sedge, yellow bluebeadlily, running clubmoss, Canada beadruby, Clayton's sweetroot, western brackenfern, blackberry, starry false Solomon's seal, starflower, and mapleleaf viburnum

## **Typical Profile**

Oa-0 to 2 inches; highly decomposed plant material

E-2 to 12 inches; very cobbly sand

Bhs—12 to 15 inches; extremely gravelly coarse sand

Bs—15 to 23 inches; extremely cobbly sand

BC-23 to 33 inches; extremely cobbly coarse sand

2R-33 to 80 inches; unweathered bedrock

## **Minor Components**

#### **Redrim soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

## Abbaye soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1702607—Deerton-Brownstone complex, 6 to 15 percent slopes, very stony

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,000 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Deerton and similar soils: 50 percent Brownstone and similar soils: 40 percent Dissimilar minor components: 10 percent

#### **Description of the Deerton Soil**

## **Taxonomic Classification**

Sandy, mixed, frigid Typic Haplorthods

## Setting

Landform: Hills

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy outwash beach deposits or sandy residuum from sandstone

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Very low (about 2.6 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: A

#### Vegetation

Existing plants: Balsam fir, sugar maple, sedge, spinulose woodfern, trailing arbutus, eastern teaberry, Canada beadruby, blackberry, thimbleberry, and American starflower

## **Typical Profile**

Oa—0 to 1 inch; highly decomposed plant material

E-1 to 9 inches; sand

Bhs—9 to 10 inches; loamy sand

Bs—10 to 25 inches; sand

2Cr—25 to 39 inches; weathered bedrock 2R—39 to 80 inches; unweathered bedrock

## **Description of the Brownstone Soil**

#### **Taxonomic Classification**

Sandy-skeletal, mixed, frigid Typic Haplorthods

## Setting

Landform: Hills

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Very low

Parent material: Sandy-skeletal beach deposits or residuum from sandstone, or both

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches Drainage class: Excessively drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 3.0 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 7s

Meets hydric soil criteria: No Hydrologic soil group: B

## Vegetation

Existing plants: Aster, sedge, yellow bluebeadlily, running clubmoss, Canada beadruby, Clayton's sweetroot, western brackenfern, blackberry, starry false Solomon's seal, starflower, and mapleleaf viburnum

#### **Typical Profile**

Oa—0 to 2 inches; highly decomposed plant material

E-2 to 12 inches; very cobbly sand

Bhs—12 to 15 inches; extremely gravelly coarse sand

Bs—15 to 23 inches; extremely cobbly sand

BC—23 to 33 inches; extremely cobbly coarse sand

2R-33 to 80 inches; unweathered bedrock

## **Minor Components**

#### **Redrim soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Abbaye soils

Percent of map unit: 3 percent Representative aspect: North Meets hydric soil criteria: No

## Zeba soils

Percent of map unit: 2 percent Representative aspect: North Meets hydric soil criteria: No

# 1702608—Abbaye loamy sand, 6 to 15 percent slopes

## Map Unit Setting

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,095 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 120 days

## **Map Unit Composition**

Abbaye and similar soils: 90 percent Dissimilar minor components: 10 percent

#### **Description of the Abbaye Soil**

#### **Taxonomic Classification**

Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods

## Setting

Landform: Hills

Landform position (two-dimensional): Shoulder and backslope

Slope range: 6 to 15 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Medium

Parent material: Till underlain by sandstone bedrock

Restrictive feature(s): Lithic bedrock at a depth of 20 to 40 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 18 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 4.7 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4e

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Balsam fir, sugar maple, yellow birch, sedge, yellow bluebeadlily, spinulose woodfern, shining clubmoss, Canada beadruby, hairy Solomon's seal, red elderberry, feather Solomon's seal, twistedstalk, and American starflower

## **Typical Profile**

Oi—0 to 2 inches; slightly decomposed plant material

A—2 to 4 inches; loamy sand E—4 to 13 inches; loamy sand Bs—13 to 25 inches; sandy loam B/E—25 to 32 inches; sandy loam

2R—32 to 80 inches; unweathered bedrock

## **Minor Components**

## **Deerton soils**

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

#### Zeba soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# 1711685—Cublake-Keweenaw, stony complex, 0 to 6 percent slopes

## **Map Unit Setting**

Major land resource area (MLRA): 92—Superior Lake Plain

Elevation: 600 to 1,945 feet

Mean annual precipitation: 26 to 33 inches Mean annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 135 days

## **Map Unit Composition**

Cublake and similar soils: 50 percent Keweenaw and similar soils: 30 percent Dissimilar minor components: 20 percent

## **Description of the Cublake Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Oxyaquic Haplorthods

## Setting

Landform position (two-dimensional): Footslope

Slope range: 0 to 6 percent Down-slope shape: Linear Across-slope shape: Concave Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

## **Properties and Qualities**

Runoff: Negligible

Parent material: Sandy outwash underlain by stratified silty, loamy, and sandy

glaciofuvial deposits

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Water table (depth, kind): About 24 inches, perched (see table 19)

Drainage class: Moderately well drained Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Low (about 5.4 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 4s

Meets hydric soil criteria: No Hydrologic soil group: A

## Vegetation

Existing plants: Spreading dogbane, American hazelnut, flowering spurge, Virginia strawberry, rose, dwarf red blackberry, starry false Solomon's seal, and lowbush blueberry

## **Typical Profile**

A—0 to 3 inches; sand E—3 to 4 inches; sand Bs—4 to 23 inches; sand BC—23 to 32 inches; sand C1—32 to 40 inches; sand

C2—40 to 48 inches; stratified fine sand to very fine sand 2C3—48 to 60 inches; stratified very fine sandy loam to silt loam

## **Description of the Keweenaw Soil**

#### **Taxonomic Classification**

Sandy, mixed, frigid Alfic Haplorthods

## Setting

Landform: Disintegration moraines

Landform position (two-dimensional): Summit

Slope range: 2 to 6 percent Down-slope shape: Convex Across-slope shape: Convex Representative aspect: North Soil temperature class: Frigid Soil temperature regime: Frigid

#### **Properties and Qualities**

Runoff: Low

Parent material: Sandy till

Restrictive feature(s): None within a depth of 60 inches

Frequency of flooding: None Frequency of ponding: None

Depth to water table: More than 72 inches

Drainage class: Well drained

Shrink-swell potential: Low (about 1.5 LEP)

Salinity maximum: Not saline Sodicity maximum: Not sodic

Calcium carbonate equivalent (maximum weight percentage): 0

Available water capacity: Moderate (about 7.8 inches)

## **Interpretive Groups**

Land capability subclass (nonirrigated): 3s

Meets hydric soil criteria: No Hydrologic soil group: B

#### Vegetation

Existing plants: Decomposition brackenfern, juneberry, lily-of-the-valley, bellwort, large-leaved aster, and blueberry

## **Typical Profile**

A—0 to 2 inches; loamy sand E—2 to 4 inches; loamy sand

Bs1,Bs2—4 to 16 inches; loamy sand Bs3—16 to 20 inches; loamy sand E´—20 to 27 inches; loamy sand

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

E/B—27 to 43 inches; sand B/E—43 to 75 inches; loamy sand C—75 to 80 inches; loamy sand

## **Minor Components**

## Annalake soils

Percent of map unit: 10 percent Representative aspect: North Meets hydric soil criteria: No

## Flink soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

## Gogebic soils

Percent of map unit: 5 percent Representative aspect: North Meets hydric soil criteria: No

# Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils within Apostle Islands National Lakeshore. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils as farmland and as sites for buildings, sanitary facilities, highways and other transportation systems, and recreational facilities. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the park. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, and trees and shrubs.

## **Interpretive Ratings**

The interpretive tables in this survey rate the soils in the park for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

## Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *slightly limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately well suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

## **Numerical Ratings**

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact

on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

## **Land Capability Classification**

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA-SCS, 1961). Only class and subclass are used in this survey.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, e, w, s, or c, to the class numeral, for example, 2e. The letter e shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony; and c, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

The capability classification of map units in this park is given in the section "Detailed Soil Map Units" and in table 2.

## **Prime and Other Important Farmland**

Table 3 lists the map units in the park that are considered important farmlands. Important farmlands consist of prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmlands, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

For some soils identified as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops, such as citrus, tree nuts, olives, cranberries, and other fruits and vegetables. It has the special combination of soil quality, growing season, moisture supply, temperature, humidity, air drainage, elevation, and aspect needed for the soil to economically produce sustainable high yields of these crops when properly managed. The water supply is dependable and of adequate quality. Nearness to markets is an additional consideration. Unique farmland is not based on national criteria. It commonly is in areas where there is a special microclimate, such as the wine country in California.

In some areas, land that does not meet the criteria for prime or unique farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield

as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

In some areas that are not identified as having national or statewide importance, land is considered to be *farmland of local importance* for the production of food, feed, fiber, forage, and oilseed crops. This farmland is identified by the appropriate local agencies. Farmland of local importance may include tracts of land that have been designated for agriculture by local ordinance.

## **Hydric Soils**

Table 4 lists the map unit components that are rated as hydric soils in the park. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; USDANRCS, 2010).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin et al., 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 2010) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (USDA-NRCS, 2010).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

- 1. All Histels except for Folistels and Histosols except for Folists.
- 2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
  - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
  - B. are poorly drained or very poorly drained and have either:
    - 1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
    - 2) a water table at a depth of 0.5 foot or less during the growing season if saturated hydraulic conductivity ( $K_{\rm sat}$ ) is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
    - 3) a water table at a depth of 1.0 foot or less during the growing season if saturated hydraulic conductivity ( $K_{sat}$ ) is less than 6.0 in/hr in any layer within a depth of 20 inches.
- 3. Soils that are frequently ponded for periods of long or very long duration during the growing season.
- 4. Soils that are frequently flooded for periods of long or very long duration during the growing season.

## **Landform and Parent Material**

Table 5 displays information about the climate, location, and parent material of each soil in the map units.

Percent of the map unit is the extent of the named soil in the map unit.

*Slope* is the inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance. The table shows the low and high range of slope for the named component or soil.

*Elevation* is the height of an object or area on the earth's surface in reference to a fixed point, such as mean sea level. The typical low and high range of elevation is displayed for each soil.

MAP is the mean annual precipitation for areas of the soil in the map unit.

Landform is a specific shape of the earth in the area where a soil typically occurs.

Examples are a mountain summit and a valley bottom.

Parent material is the material in which soils formed. Examples are the underlying geological material (including bedrock), a surficial deposit (such as volcanic ash), and organic material. Soils inherit their chemical and physical properties from the parent material.

## **Land Management**

In table 6, parts I through IV, interpretive ratings are given for various aspects of land management. The ratings are both verbal and numerical.

Some rating class terms indicate the degree to which the soils are suited to a specified land management practice. *Well suited* indicates that the soil has features that are favorable for the specified practice and has no limitations. Good performance can be expected, and little or no maintenance is needed. *Moderately suited* indicates that the soil has features that are moderately favorable for the specified practice. One or more soil properties are less than desirable, and fair performance can be expected. Some maintenance is needed. *Poorly suited* indicates that the soil has one or more properties that are unfavorable for the specified practice. Overcoming the unfavorable properties requires special design, extra maintenance, and costly alteration. *Unsuited* indicates that the expected performance of the soil is unacceptable for the specified

practice or that extreme measures are needed to overcome the undesirable soil properties.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the specified land management practice (1.00) and the point at which the soil feature is not a limitation (0.00).

Rating class terms for *fire damage* and *seedling mortality* are expressed as low, moderate, and high. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for fire damage or seedling mortality is highest (1.00) and the point at which the potential is lowest (0.00).

Rating class terms for *hazard of erosion* are expressed as slight, moderate, severe, and very severe. Where these terms are used, the numerical ratings indicate gradations between the point at which the potential for erosion is highest (1.00) and the point at which the potential is lowest (0.00).

The paragraphs that follow indicate the soil properties considered in rating the soils for land management practices.

## **Planting**

Ratings in the columns *suitability for hand planting* and *suitability for mechanical planting* are based on slope, depth to a restrictive layer, content of sand, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, moderately suited, poorly suited, or unsuited to these methods of planting. It is assumed that necessary site preparation is completed before seedlings are planted.

Ratings in the column *soil rutting hazard* are based on depth to a water table, rock fragments on or below the surface, the Unified classification, depth to a restrictive layer, and slope. Ruts form as a result of the operation of planting equipment. The hazard is described as slight, moderate, or severe. A rating of *slight* indicates that the soil is subject to little or no rutting, *moderate* indicates that rutting is likely, and *severe* indicates that ruts form readily.

## Hazard of Erosion and Suitability for Roads

Ratings in the column *hazard of erosion* are based on slope and on soil erodibility factor K. The soil loss is caused by sheet or rill erosion in areas where 50 to 75 percent of the surface has been exposed by different kinds of disturbance. The hazard is described as slight, moderate, severe, or very severe. A rating of *slight* indicates that erosion is unlikely under ordinary climatic conditions; *moderate* indicates that some erosion is likely and that erosion-control measures may be needed; *severe* indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and *very severe* indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical.

Ratings in the column hazard of erosion on roads and trails are based on the soil erodibility factor K, slope, and content of rock fragments. The ratings apply to unsurfaced roads and trails. The hazard is described as slight, moderate, or severe. A rating of slight indicates that little or no erosion is likely; moderate indicates that some erosion is likely, that the roads or trails may require occasional maintenance, and that simple erosion-control measures are needed; and severe indicates that significant erosion is expected, that the roads or trails require frequent maintenance, and that costly erosion-control measures are needed.

Ratings in the column *suitability for roads (natural surface)* are based on slope, rock fragments on the surface, plasticity index, content of sand, the Unified classification, depth to a water table, ponding, flooding, and the hazard of soil slippage. The ratings

indicate the suitability for using the natural surface of the soil for roads. The soils are described as well suited, moderately suited, or poorly suited to this use.

## **Site Preparation**

Ratings in the column *suitability for mechanical site preparation (deep)* are based on slope, depth to a restrictive layer, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 3 feet is considered in the ratings.

Ratings in the column *suitability for mechanical site preparation (surface)* are based on slope, depth to a restrictive layer, plasticity index, rock fragments on or below the surface, depth to a water table, and ponding. The soils are described as well suited, poorly suited, or unsuited to this management activity. The part of the soil from the surface to a depth of about 1 foot is considered in the ratings.

## **Site Restoration**

Ratings in the column *potential for damage to soil by fire* are based on texture of the surface layer, content of rock fragments and organic matter in the surface layer, thickness of the surface layer, and slope. The soils are described as having a low, moderate, or high potential for this kind of damage. The ratings indicate an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

Ratings in the column *potential for seedling mortality* are based on flooding, ponding, depth to a water table, content of lime, reaction, salinity, available water capacity, soil moisture regime, soil temperature regime, aspect, and slope. The soils are described as having a low, moderate, or high potential for seedling mortality.

## Recreation

The soils of the park are rated in table 7, parts I and II, according to limitations that affect their suitability for recreation. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect the recreational uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

The ratings in the table are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation also are important. Soils that are subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for building site development, construction materials, and water management.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The ratings are based on the soil properties that affect the ease of developing camp areas and the performance of the areas after development. Slope, stoniness, and depth to bedrock or a cemented pan are the main concerns affecting the development of camp areas. The soil properties that affect the performance of the areas after development are those that influence trafficability and promote the growth of vegetation, especially in heavily used areas. For good trafficability, the surface of camp areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The ratings are based on the soil properties that affect the ease of developing picnic areas and that influence trafficability and the growth of vegetation after development. Slope and stoniness are the main concerns affecting the development of picnic areas. For good trafficability, the surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry. The soil properties that influence trafficability are texture of the surface layer, depth to a water table, ponding, flooding, permeability, and large stones. The soil properties that affect the growth of plants are depth to bedrock or a cemented pan, permeability, and toxic substances in the soil.

Foot traffic and equestrian trails for hiking and horseback riding should require little or no slope modification through cutting and filling. The ratings are based on the soil properties that affect trafficability and erodibility. These properties are stoniness, depth to a water table, ponding, flooding, slope, and texture of the surface layer.

Mountain bike and off-road vehicle trails require little or no site preparation. They are not covered with surfacing material or vegetation. Considerable compaction of the soil material is likely. The ratings are based on the soil properties that influence erodibility, trafficability, dustiness, and the ease of revegetation. These properties are stoniness, depth to a water table, ponding, slope, flooding, and texture of the surface layer.

# **Engineering**

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, landscaping, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for septic tank absorption fields and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, ponds, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil map, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

## **Dwellings and Small Commercial Buildings**

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 8 shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties

that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

## Roads and Streets, Shallow Excavations, and Landscaping

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. Table 9 shows the degree and kind of soil limitations that affect local roads and streets, shallow excavations, and landscaping.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on

the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Landscaping requires soils on which turf, trees, and shrubs can be established and maintained. Irrigation is not considered in the ratings. The ratings are based on the soil properties that affect plant growth and trafficability after vegetation is established. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; the available water capacity in the upper 40 inches; the content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding, depth to a water table, ponding, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer.

#### Sewage Disposal

Table 10 shows the degree and kind of soil limitations that affect septic tank absorption fields and sewage lagoons. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches or between a depth of 24 inches and a restrictive layer is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity ( $K_{\text{sat}}$ ), depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, saturated hydraulic conductivity ( $K_{sat}$ ), depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Saturated hydraulic conductivity ( $K_{sat}$ ) is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a  $K_{sat}$  rate of more than 14 micrometers per second are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, or if floodwater overtops the lagoon.

A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

#### Source of Gravel and Sand

Table 11 gives information about the soils as potential sources of gravel and sand. Normal compaction, minor processing, and other standard construction practices are assumed.

*Gravel* and *sand* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. Only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness. The ratings are for the whole soil, from the surface to a depth of about 6 feet.

The soils are rated *good*, *fair*, or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

#### Source of Reclamation Material, Roadfill, and Topsoil

Table 12 gives information about the soils as potential sources of reclamation material, roadfill, and topsoil. Normal compaction, minor processing, and other standard construction practices are assumed.

The soils are rated *good, fair,* or *poor* as potential sources of reclamation material, roadfill, and topsoil. The features that limit the soils as sources of these materials are specified in the table. Numerical ratings between 0.00 and 0.99 are given after the specified features. These numbers indicate the degree to which the features limit the soils as sources of topsoil, reclamation material, or roadfill. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not

apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate; reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments. The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area. The ratings are based on the soil properties that affect plant growth; the ease of excavating, loading, and spreading the material; and reclamation of the borrow area. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

#### **Ponds and Embankments**

Table 13 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential

is determined by the saturated hydraulic conductivity ( $K_{sat}$ ) of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, K<sub>sat</sub> of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

# **Soil Properties**

Data relating to soil properties are collected during the course of the soil survey. Soil properties are ascertained by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine particle-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties are shown in tables. They include engineering properties, physical and chemical properties, and pertinent soil and water features.

## **Engineering Properties**

Table 14 gives the engineering classifications and the range of engineering properties for the layers of each soil in the park.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement,

the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

## **Physical Soil Properties**

Table 15 shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the park. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity ( $K_{sat}$ ), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at <sup>1</sup>/<sub>3</sub>- or <sup>1</sup>/<sub>10</sub>-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water

and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability  $(K_{sat})$  refers to the ability of a soil to transmit water or air. The term "permeability," as used in soil surveys, indicates saturated hydraulic conductivity  $(K_{sat})$ . The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on the basis of measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; *high*, 6 to 9 percent; and *very high*, greater than 9 percent.

*Organic matter* is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

## **Erosion Properties**

Table 16 shows estimates of some erosion factors that affect a soil's potential for different uses. These estimates are given for each layer of every soil for K factors and are given as one rating for the entire soil for the T factor, the wind erodibility group, and the wind erodibility index. Values are reported for each soil in the park. Estimates are based on field observations and on test data for these and similar soils.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Soil erosion factors Kw and Kf quantify soil detachment by runoff and raindrop impact. These erosion factors are indexes used to predict the long-term average soil loss from sheet and rill erosion under crop systems and conservation techniques. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and  $K_{\text{cat}}$ . Values

of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

The procedure for determining the Kf factor is outlined in Agriculture Handbook 703, "Predicting Soil Erosion by Water: A Guide to Conservation Planning with the Revised Universal Soil Loss Equation (RUSLE)," USDA, Agricultural Research Service, 1997.

Depth to the upper and lower boundaries of each layer is indicated.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments. In horizons where total rock fragments are 15 percent or more, by volume, the Kw factor is always less than the Kf factor.

*Erosion factor Kf* indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size. Soil horizons that do not have rock fragments are assigned equal Kw and Kf factors.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

#### **Total Soil Carbon**

Table 17 gives estimates of total soil carbon. Soil carbon occurs as organic and inorganic carbon.

Soil organic carbon (SOC) is carbon (C) in soil that originated from a biological source, such as plants, animals, or micro-organisms. SOC is found in both organic and mineral soil layers. The term "soil organic carbon" refers only to the carbon occurring in soil organic matter (SOM). Soil organic carbon makes up about one-half the weight of soil organic matter. The rest of SOM is mostly oxygen, nitrogen, and hydrogen.

Soil inorganic carbon (SIC) is carbon found in soil carbonates, typically as calcium carbonate layers in the soil or as clay-sized fractions throughout the soil. Carbonates in soils are most common in areas where evaporation rates exceed precipitation, as is the case in most desert environments. Typically, the carbonates accumulated from carbonatic dust or from solution during periods of wetter climates. Soil inorganic carbon also occurs in soils that formed in marl in all regions of the country.

The SOC and SIC contents are reported in kilograms per square meter to a depth of 2 meters or to a representative depth of either hard bedrock or a cemented horizon. The SOC and SIC values are on a whole soil basis, corrected for rock fragments.

SOC can be an indicator of overall soil fertility and soil quality that affects ecosystem function. SOM is the main reservoir for most plant nutrients, such as phosphorus and nitrogen. Managing for SOC by managing for SOM increases the content of these elements and improves soil resiliency.

Soil organic matter binds soil particles together and thus increases soil porosity and water infiltration and allows better root penetration and waterflow into the soil. Greater inflow of water reduces the hazard of erosion and the rate of surface water runoff.

Greater SOC levels improve not only soil quality but also the quality of air and water. Soil acts as a filter and improves water quality. Fertile soils that support plant life remove CO<sub>2</sub> from the atmosphere and increase oxygen levels through photosynthesis. Maintaining the level of soil organic carbon reduces C release into the atmosphere and thus can lessen the effects of global warming.

SIC influences the types of plants that will grow. High SIC levels are commonly associated with a higher soil pH, which limits the types of plants that will thrive.

Like SOM, soil carbonates, the source of SIC, also bind soil particles together. They fill voids in the soil and thus can reduce soil porosity. Compacted soil carbonates may restrict root penetration and waterflow into the soil.

## **Chemical Soil Properties**

Table 18 shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the park. The estimates are based on field observations and on test data for these and similar soils.

*Depth* to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable cations plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

*Soil reaction* is a measure of acidity or alkalinity. The pH of each soil horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

#### **Water Features**

Table 19 gives estimates of various soil water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which a water table, ponding, and/or flooding is most likely to be a concern.

Water table refers to a saturated zone in the soil. Table 19 indicates, by month, depth to the top (upper limit) and base (lower limit) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates surface water depth and the duration and frequency of ponding. Duration is expressed as very brief if less than 2 days, brief if 2 to 7 days, long if 7 to 30 days, and very long if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. None means that ponding is not probable; rare that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); occasional that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and frequent that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

*Flooding* is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and frequency are estimated. Duration is expressed as extremely brief if 0.1 hour to 4 hours, very brief if 4 hours to 2 days, brief if 2 to 7 days, long if 7 to 30 days, and very long if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. None means that flooding is not probable; very rare that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); rare that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); occasional that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); frequent that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and very frequent that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

#### **Soil Features**

Table 20 gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the thickness and hardness of the restrictive layer, both of

which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (K<sub>sat</sub>), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

# Formation and Classification of the Soils

This section relates the soils in Apostle Islands National Lakeshore to the major factors of soil formation and describes the system of soil classification.

#### **Factors of Soil Formation**

By Susan Burlew Southard, Natural Resources Conservation Service.

Soil covers the surface of the earth as a three-dimensional body of varying thickness and is made up of different proportions of organic and mineral material, pore space with gases, and water. Soils differ in their appearance, productivity, and management requirements due to their chemical and physical properties. The characteristics and properties of soils are determined by physical and chemical processes that result from the interaction of five soil-forming factors. These factors of soil formation are interdependent, and few generalizations can be made regarding any one factor unless the effects of the other factors are known. The term "pedogenesis" is often used to connote the processes of soil formation.

The interacting soil-forming factors are parent material, climate, organisms, time, and relief or topography (Jenny, 1941). *Parent material* is the source material in which soils formed. Soils are influenced by the texture and structure of the parent material and its mineralogical and chemical composition. *Climate* is predominantly the temperature and kind and amount of precipitation. It is also seasonal distribution of temperatures and precipitation. *Organisms* are the plants and other organisms living in and on the soil, including humans. *Time* refers to how long the soil-forming factors have been operating on a particular landscape. *Relief* or *topography* is the shape and elevation of the landscape. It affects internal and external soil properties, such as soil drainage, aeration, susceptibility to erosion, and the soil's exposure to the sun and wind.

The processes of soil formation are a sequence of events, involving biogeochemical reactions that are energized by climate and spatially related to relief or topography (Buol et al., 2011). The physical and chemical properties of a soil are altered by these reactions over time. The influence of any one of these factors varies among all parks and within localities of a particular park. Soils may differ significantly from place to place in a park and within very short distances as a result of complex interactions among the five factors. In some cases, however, parks may have vast stretches of the same type of soil because of uniform soil-forming factors.

#### **Setting of Apostle Islands National Lakeshore**

Understanding the setting of Apostle Islands National Lakeshore (Apostle Islands NL) helps in understanding the parent materials contributing to the types of soils within it. Understanding the soils of the park also helps in understanding the unique relationship between soils and the environment. Soil-forming processes are influenced by rock type, topographic expression, and the hydrologic properties of the area. Soil formation influences soil properties and behaviors, which are used when determining best management practices.

Apostle Islands NL is located along the southwestern shore of Lake Superior in Wisconsin. In 1970, it was officially designated as National Lakeshore in the park system. The National Lakeshore consists of 21 islands and a strip of the mainland, encompassing about 70,000 acres (see park map). The islands are located at the tip of the Bayfield Peninsula in northern Wisconsin. Part of the park is located along the shoreline of the Bayfield Peninsula. The park's environmental features include a number of regionally rare habitats, including old-growth forest, boreal forest, five types of northern forests, forest seeps, clay bluff communities, sandstone cliff communities, lagoon and bog communities, forested ridge and swale, coastal fen, Great Lakes barrens, and dune communities (USDI-NPS, 2013). All of the Apostle Islands are part of the Chequamegon Sandstone (or Brownstone) Formation, which is part of the Bayfield group of Cambrian sandstones. Chequamegon Sandstone has a reddish brown hue because of the presence of small amounts of iron ore.

The physical geography of the broader landscape of Wisconsin and the Great Lakes, including the park, is the result of the erosion and deposition of materials caused by the advancement and retreat of glaciers over the last 2 million years. Glaciers scoured the surface of the earth, leveled hills, and altered the previous landscape. Valleys created by the river systems of the previous era were deepened and enlarged to form basins of the Great Lakes. As the climate warmed, the glaciers retreated. Glacial retreat was followed by an interglacial period during which vegetation and wildlife thrived. This cycle was repeated several times. The most important glacial advance for northern Wisconsin that affected the landscape of the park today is the Wisconsin stage, which retreated from Wisconsin about 9,500 to 15,000 years ago.

As the glaciers retreated, meltwater formed along the front of the ice. Because the land was greatly depressed from the weight of glaciers, large post-glacial lakes formed at this time. These lakes were much larger than the present-day Great Lakes. Evidence of these lakes can still be seen in the form of beach ridges, eroded bluffs, and flat plains located hundreds of feet above present lake levels. Regional uplift (often referred to as crustal or isostatic rebound) caused dramatic changes in the depth, size, and drainage patterns of the post-glacial lakes. The changing drainage patterns and water velocities also changed the type and sizes of materials deposited. The changes in materials influenced the soils that would subsequently form from the deposits, and different soils have been identified on the different landforms.

The bluffs on some of the islands are characteristic of the Great Lakes regional shoreline. The ice lobes gouged debris from the valley floors and deposited it along the sides of the valleys when the ice finally melted. This debris was eventually deposited by the ice, creating prominent moraines. The park lakeshore and islands today are covered by recent alluvium, some dune sand, and Pleistocene glacial deposits.

#### **Parent Material**

Parent material is the unconsolidated mass in which soils form. Mineral soil parent material is a product of weathering of underlying bedrock in place or weathering of material that has been transported. Organic soils form in place from the accumulation and decomposition of plant material, such as wood, leaves, and aquatic plants. Weathering refers to the chemical and physical disintegration and decomposition of parent material.

Few soils weather directly from the underlying rocks, or what is referred to as residuum. More commonly, soils form in materials that have been moved from elsewhere. Soils may have a dominant kind of parent material but were influenced by other types of parent material as well. Material may have been moved only a few feet by gravity (colluvial parent material), deposited by ice, or transported long distances by wind (eolian or loess parent material) or water (alluvial parent material).

Drift is a broad, general term often used in describing glacial parent material. Drift is mineral material (clay, silt, sand, gravel, cobbles, and boulders) transported by a

glacier and deposited directly by or from the ice or by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer have glaciers.

Glaciofluvial deposits are another type of parent material deposited by glaciers and may have also been sorted and redeposited by water. In the northeastern and north-central parts of the United States, soil scientists make a distinction between the glacial fluvial processes of the past and the recent fluvial processes forming alluvium less than 10,000 years old (Holocene age). For example, late Pleistocene glaciofluvial deposits are often termed *outwash*, while Holocene flood plain deposits are termed *alluvium*. In Apostle Islands NL, Cublake soils have glaciofluvial parent material, Kellogg soils formed in glaciolacustrine parent material, and Moquah and Mehan soils on flood plains and beach ridges formed in sandy alluvium. The most common soil parent materials in Apostle Islands NL are glaciolacustrine deposits, outwash, till, and plant residuum. Many of the soils in the park formed in a combination of all of these parent materials.

Table 5 lists the major soils in each map unit of the park and their most common associated landforms and parent material types.

#### **Glaciofluvial or Outwash Parent Material**

Outwash deposits are stratified and sorted sediments (chiefly sand and gravel) removed or "washed out" from a glacier by meltwater streams and deposited in front of or beyond the end or the margin of a glacier. Outwash can have a variety of particle sizes. The particle-size distribution of outwash depends upon the velocity of the meltwaters carrying the sediment away from the glaciers. In general, the higher the velocity of water the larger the particle the water can transport. Rock fragments in outwash are commonly subrounded to rounded due to the fact that they were tumbled and polished during transport. Soils that formed from outwash may have a high content of rocks. Most of the soils that formed in outwash are predominantly sandy. Certain landforms are associated with outwash, and certain soils occur on these landforms.

An *outwash plain* is an extensive lowland landscape of coarse textured material. It may be pitted with depressions due to melt-out of incorporated glaciers. The depressions commonly occur as kettles that formed by melt-out of incorporated ice blocks of glaciers.

A *lake terrace* is a narrow shelf, partly wave cut and partly wave built, produced along a lake shore in front of a scarp line of low cliffs and later exposed when the water level fell.

An *outwash terrace* is a flat-topped bank of outwash with an abrupt outer face (scarp or riser) extending along a valley downstream from an outwash plain or terminal moraine. It is also termed a valley train deposit.

The assemblage of landforms in the park makes up an ice margin complex that formed next to a relatively static, rapidly wasting continental glacial margin. Landforms include ice-contact slope, ice-contact delta, kame, kame moraine, kettle, outwash fan, small outwash plain, and small proglacial lake. Moraines, if they occur, are of limited occurrence (except kame moraines, which can be extensive). Glaciofluvial sediments dominate, but glaciolacustrine sediments and till can occur in minor amounts. Ice margin complexes also have glacial drainage channels that were formed by an ice-marginal, englacial, or subglacial stream during glaciation.

Cublake soils are very deep, are moderately well drained, and formed in deep sandy outwash underlain by stratified silty, loamy, and sandy glaciofluvial deposits on mostly outwash terraces, outwash plains, and glacial lake plains. Permeability is moderately rapid or rapid in the sandy outwash and moderately slow or moderate

in the glaciofluvial deposits. Thickness of the sandy mantle of these soils and depth to the stratified silty, loamy, and sandy horizons range from 40 to 60 inches. Rock fragments typically do not occur, but the volume of gravel ranges from 0 to 15 percent in the sandy mantle and from 0 to 5 percent in the stratified loamy and sandy material. Soils associated with Cublake soils in the park are Au Gres, Croswell, Croswood, Flink, Rubicon, and Sultz. The somewhat poorly drained Au Gres soils, the moderately well drained Croswell soils, and the excessively drained Rubicon and Vilas soils form a drainage sequence (or drainage catena) in nearby areas. Croswood soils are on outwash-veneered areas of moraines and drumlins where loamy glacial till occurs at a depth of 40 to 60 inches. The somewhat poorly drained Flink soils and the well drained Sultz soils form a drainage catena with Cublake soils. Most areas are used for woodland. Mature forests growing on these soils are mostly red maple, northern red oak, paper birch, yellow birch, hemlock, eastern white pine, and red pine, but balsam fir and quaking aspen are in most stands. Some areas of Cublake soils were used for cropland and pastureland. Cublake and associated soils are mapped on most of the islands, but most of their acreage is on Oak, Hermit, and southern Bear Islands and in the central part of Outer Island.

Au Gres soils are sandy and formed in sandy outwash on outwash plains (fig. 1). These soils are mapped only on the mainland, in the Bayfield County area of the park, along minor drainages that flow into Sand Bay. They are very deep, are somewhat poorly drained, and formed in sandy fluvial and lacustrine deposits on ice margin complexes, kame moraines, stream terraces, outwash plains, lake terraces, lake plains, and ground moraines. Au Gres soils generally have slopes of 0 to 6 percent. Only a small part of the acreage of Au Gres soils was ever cultivated. Traditionally, some areas were in permanent pasture and others were used for growing specialty crops, such as blueberries and cucumbers. Many areas in the park are in various stages of reforestation. Natural forests are northern white cedar, balsam fir, hemlock, yellow birch, paper birch, aspen, and red maple.

Kinross soils also formed in outwash. These soils are mapped on Outer, Stockton, Oak, Hermit, Raspberry, Basswood, and York Islands and also on the mainland near North Branch and Engholm Roads. They are mapped in a complex with two other soils—Allendale and Wakeley. In the complex, Kinross soils make up about 20 percent of the map unit. The Kinross series consists of very deep, poorly drained and very poorly drained soils that formed in glaciofluvial material on outwash plains, stream terraces, lake plains, kames, and disintegration and ground moraines. Permeability is rapid. Slopes range from 0 to 3 percent. Gravel content ranges from 0 to 5 percent throughout the profile. Soils that are geographically associated with Kinross soils include Allendale, Wakeley, Au Gres, Croswell, Dawson, and Rubicon. These associated soils form a catena with Au Gres soils: Au Gres soils are somewhat poorly drained, Croswell soils are moderately well drained, and Rubicon soils are excessively drained. Dawson soils are shallow and organic and overlie sands. Areas of the Allendale-Wakeley-Kinross map unit typically occur on toeslopes, and their hydraulic regimes are influenced by the upwelling ground water fed from upslope landscape positions.

#### **Glaciolacustrine Deposits**

Glaciolacustrine deposits were laid down in post-glacial lakes. Post-glacial lakes formed either by the damming action of a moraine during the retreat of a melting glacier or by meltwater trapped against an ice sheet due to isostatic depression of the earth's crust. Large lakes were once a widespread feature in the northern hemisphere. Glaciolacustrine soils in Apostle Islands NL often have higher contents of silt, sand, or clay because the original lake deposits varied in size.

Lakebeds in the park formed after glacial retreat and during the post-glacial variations in water level in Lake Superior. The relict lake areas are now lake plains.



Figure 1.—Profile of an Au Gres soil. Depths on tape are in feet. Note the water at a depth of 3.5 feet. (Image is from "Landforms of the Upper Peninsula, Michigan," USDA, 2006.)

Lake plains are defined as nearly level surfaces marking the floor of extinct lakes filled by well sorted, generally fine textured, stratified deposits that commonly contain varves. Varves are sedimentary layers, lamina, or a sequence of laminae deposited in a body of still water within 1 year. Specifically, they are a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier. Lake terraces are narrow shelves, partly cut and partly built, produced along a lake shore in front of a scarp line of low cliffs and later exposed when the lake level fell.

The major soils in the park that formed on lake plains include Lerch, Kellogg, and Manistee. Lerch soils are very deep, are poorly drained and very poorly drained, and formed in clayey till and/or clayey glaciolacustrine deposits modified by wave action over loamy and/or sandy stratified lacustrine deposits. These soils are on till plains and/or lake plains. Permeability is very slow in the clayey till and moderate to rapid in the stratified substratum. Slope ranges from 0 to 2 percent. Lerch soils are mapped on lake plains on Sand, Stockton, Hermit, and Michigan Islands and in small areas on the mainland. Thickness of the clayey till or lacustrine material ranges from 40 to 60 inches over the stratified substratum. Reaction (pH) ranges from strongly acid to slightly acid in the upper part of the solum and is slightly alkaline or moderately alkaline in the lower part of the solum and in the substratum. Depth to the first occurrence of carbonates ranges from 12 to 23 inches and typically extends to 80 inches. Table 18 shows the distribution of carbonates and the ranges in soil pH for the major soils in each map unit. In Lerch soils, the weighted average clay content at a depth of 10 to 40 inches ranges from 60 to 85 percent and the total rock fragment content is less than 3 percent throughout the profile (see table 15). Redoximorphic features are evidence of water saturation, which occurs within 10 inches of the surface at some time in most years. Lerch soils are commonly ponded in the spring or after heavy rainfall events. The redoximorphic features are morphological, and soil color features are indicative of past or present soil wetness. Gray colors form in wet soils from oxidation-reduction reactions.

Other glaciolacustrine soils in the park are Kellogg and Manistee. Kellogg and Manistee soils are mapped extensively in the park on lake plains derived from sandy materials. These soils occur on the mainland and on every island, except Manitou and Michigan Islands. Slope typically ranges from 0 to 12 percent for these soils but, in the park, it ranges to 45 percent on the edges of lake plains and outwash plains on old shorelines that are dissected. These soils formed in sandy lacustrine deposits or outwash and overlie clayey till or lacustrine deposits. Kellogg soils are very deep and moderately well drained, and Manistee soils are moderately deep and well drained. Manistee soils are in landscape positions similar to or slightly higher than those of Kellogg soils and on steeper slopes.

Many soils formed in a combination of lacustrine deposits with other dominant parent materials. Soils with multiple parent materials, such as Allendale, Munuscong, Wakeley, Superior, Ashwabay, Wurtsmith, and Menominee, are common in the park. Table 15 shows the distribution of sand, silt, and clay in the soils. Many of these soils formed in a combination of outwash or alluvial parent material over glaciolacustrine deposits. They commonly have an abrupt change in particle size at depth. For example, the soils may be loamy or sandy over dense clay. The bulk density of the clayey horizon may range to 1.8 g/cc, which can restrict root growth and water movement. Map unit 433301, which is composed of Kellogg, Allendale, and Ashwabay soils, can be used to illustrate particle-size distribution. These three soils have mostly sand in the upper part (80 to 95 percent sand) but below a depth of about 30 to 34 inches, sand content drops to 2 to 15 percent and clay content jumps to as much as 60 percent. This forms a restrictive feature in the soil called an abrupt textural change (see table 20). An abrupt textural change can limit root penetration and also water movement through the soil. This can cause problems for some uses of the soils that require good drainage and no perched water within the soil. An abrupt textural change is a limitation in areas outside of the park boundary used for urban development. It also can cause significant lateral subsurface movement of water through these landscapes because the rapid permeability of the sands results in water saturation and flow above the clay. Landforms with Kellogg, Allendale, and Ashwabay soils often show upwelling ground water at the toe of slopes, particularly where the shape across and downslope is concave.

#### Till

Till is soil parent material transported, ground up, and subsequently deposited by ice. It is dominantly unsorted and unstratified material deposited directly by a glacier without subsequent reworking by meltwater. It consists of a heterogeneous mixture of clay, silt, sand, gravel, cobbles, stones, and boulders. Till may have rock fragments of various lithologies that are imbedded within a finer matrix that can range from clay to sand (USDA, 2006). The rock fragments generally are angular but can also be subrounded or rounded. The composition of the till depends on the geologic formations over which the ice passed before the till was deposited. The material in the lower part of soils derived from till may be relatively unchanged from when it was deposited by moving water, ice, or wind. The composition of till affects the properties of the soils that form from it. Some of the soil properties affected by till are kind and amount of rock fragments, color, texture, mineralogy, and pH.

Different tills are on different landforms, and different soils are associated with the landforms. The common tills in the park were deposited on *till plains, ground moraines*, *end moraines*, or *disintegration moraines*.

Till plains are extensive, flat to gently undulating areas underlain predominantly by till and bounded on the distal end by subordinate recessional or end moraines (USDA-NRCS, National Soil Survey Handbook). Sedgewick soils are mapped on till plains and are derived from loamy alluvium over clayey till. These soils are very deep, are somewhat poorly drained, and are mapped on all the islands, except North Twin Island. Thickness of the loamy mantle ranges from 10 to 24 inches, and the clay content in the clayey till ranges from 35 to 90 percent. The volume of gravel ranges from 0 to 15 percent in the loamy mantle and typically ranges from 1 to 4 percent in the clayey till, but some individual pedons or subhorizons have no gravel. The volume of cobbles ranges from 0 to 2 percent throughout the profile. Carbonates occur within the control section. They are typically at a depth of 20 to 60 inches, but the depth ranges to 80 inches in some pedons. Allendale soils are in landscape positions similar to those of Sedgwick soils but they have a mantle 20 to 40 inches thick.

Large areas of Raspberry Island are identified as till plains. Portwing soils are the major till plain soils on the island. These soils are very deep and moderately well drained and occur on lake plains. They formed in clayey till and/or clayey lacustrine deposits modified by wave action over stratified loamy and/or sandy lacustrine deposits. Permeability is slow in the clayey till and moderate to rapid in the stratified substratum. Slope ranges from 2 to 6 percent. Native vegetation is mixed deciduous and coniferous forest. Raspberry Island is the only island that has never burned, been commercially logged, or been farmed.

A *ground moraine* is an extensive, low relief area of till that has an uneven or undulating surface and is commonly bounded on the distal end by a recessional moraine or an end moraine. The till of a ground moraine is a deposit of rock and mineral debris dragged along, in, on, or beneath a glacier and emplaced by different processes. In some areas the ground moraine consists of large, relatively flat till plains; in other areas the landscape is quite hilly (USDA-NRCS, 2006). This landform occurs throughout the entire Upper Peninsula.

An *end moraine* is a ridge-like accumulation that was produced at the outer margin of an actively flowing glacier at any given time. It is a moraine that has been deposited at the outer or lower end of a valley glacier (USDA, 2006).

A disintegration moraine has a drift topography characterized by chaotic mounds and pits that generally are randomly oriented. This random orientation was caused by collapse and flow as underlying stagnant ice melted. Slopes on disintegration moraines may be steep and unstable. This landform has used and unused stream courses and lake depressions interspersed with the morainic ridges. A disintegration moraine characteristically has numerous abrupt, lateral, and vertical changes between unconsolidated materials of differing physical characteristics (USDA, 2006).

Soils in the park on moraines include Munuscong, losco, Keweenaw, and Rubicon. Some of the moraines are derived from calcareous tills. These soils typically have calcium carbonates in the subsoil (see table 18). The tills are commonly over stratified lacustrine materials that were, in part, calcareous as well.

Table 17 displays the soil carbon content of the soils to a depth of 2 meters. Soil inorganic carbon (SIC) is carbon found in soil carbonates, usually as calcium carbonate layers in the soil or as clay-sized fractions throughout the soil. Carbonates in soils occur in areas where evaporation rates exceed precipitation, as is the case in most desert environments. The carbonates typically accumulated from carbonatic dust or from solution when wetter climates existed. In the area of the country in which the park is located, the SIC is associated with till and lacustrine materials that were calcareous. SIC is measured by treating the soil with HCl then measuring the evolved CO<sub>2</sub> with a manometer. It is reported in table 17 on a volumetric basis. Many of the park soils, based on a representative value of calcium carbonate weight, have carbon contents in the SIC that far exceed soil organic carbon in the soil's organic matter. For example, Sedgwick and Munuscong soils have about three times the amount of soil inorganic carbon as soil organic carbon. Wakeley soils have the highest amount of soil inorganic carbon of the soils in the park. The 44 kg/m² of SIC equates to 196 tons of carbon per acre.

It is difficult to consistently associate tills and soils to specific moraines since numerous advancements and retreats of the ice left a series of moraines that were often partially or completely destroyed. The ice varied in the distance travelled south with each advancement and retreat, and till and lacustrine deposits became mixed. Some soils may be on more than one landform due to the difficulties in consistently identifying the landforms and parent materials.

The Natural Resources Conservation Service has different terms for till. Many of these terms are associated with soils in the park in current soils data (March 2013) and are displayed in table 5.

#### **Eolian Deposits**

Eolian material, such as windblown sand, is a type of parent material. Windblown loess, another type of eolian parent material, consists mainly of silt-sized particles. During interglacial periods, strong directional winds deposited silts great distances from their lacustrine or outwash origin. Soils influenced by loess have a high silt content in the upper horizons, whereas soils influenced by eolian parent material have a high sand content. Windblown deposits buried till, outwash, and lacustrine deposits in areas of Apostle Islands NL. Table 15 shows the distribution of sand, silt, and clay in the soils

Some soils on wooded and active dunes on beach ridges, such as Grayling, Meehan, and Wurtsmith, are comprised of sands. A beach ridge is a low, essentially continuous ridge of beach and dune material that was heaped up by the action of waves and currents on the backshore of a beach, beyond the present limit of storm waves, and occurs singly or as one of a series of approximately parallel deposits. The ridges are roughly parallel to the shoreline and represent successive positions of the advancing or rising shoreline. Many of the higher ridges are dunes that formed due to the prevailing winds along the lakes. The dunes are either active (moving and unvegetated) or stabilized. Eolian deposits may also be on lake terraces. The eolian soils in the park are mostly on the spit extending into Chequamegon Bay (Long Island) and on the southern tips of several islands, including Michigan, Outer, Otter, Bear, and North Twin.

#### Residuum

Soils are said to have residual parent material if they formed directly from underlying rocks or from an *in situ* plant (organic) source.

Rock residuum. Soils that formed in rock residuum may have the same general chemistry as the original rocks, depending on the degree of weathering that has occurred. Redrim, Deerton, and Brownstown soils are all on hillslopes and formed, in part, in residuum. These soils have sandy beach deposits over weathered sandstone bedrock. Redrim soils are shallow (depth to reddish brown sandstone is less than 20 inches). Brownstone soils have a sandy-skeletal mantle 20 to 40 inches thick over sandstone. Deerton soils have a sandy mantle 20 to 40 inches thick over sandstone. Most areas are forested with red maple, paper birch, yellow birch, bigtooth aspen, balsam fir, eastern hemlock, and northern white cedar.

Redrim, Deerton, and Brownstown soils formed, in part, in residuum and are generally on the northeastern edge of most of the islands and the southeastern edge of Stockton, Basswood, and Outer Islands. Brownstone soils are named for the sandstone that was mined in the park to build brownstone buildings. Between 1868 and 1898, four sites in the Apostle Islands hosted seven separate brownstone quarry operations. The quarries eventually closed because of national economic problems, changes in architectural tastes, and the development of new types of building materials (USDI-NPS, 2002). The light on Outer Island has a cut-brownstone foundation, made from the parent material of Deerton and Brownstown soils that are mapped 1 mile to the east of the light. During 2004 and 2005, an erosion-control project was implemented at Outer Island Light to stabilize the bluff, mapped as Udorthents. The base of the cliff was armored with a massive stone wall, and drainage on the station grounds was improved to prevent runoff from the eroding Udorthents on the clay bank (fig. 2).

Organic residuum. Many of the soils in the park formed largely from plant residuum. These soils are commonly in depressions on outwash plains, lake plains, or moraines. The depressions are typically kettles that were formed by the melting of a large, detached block of stagnant ice that had been wholly or partly buried in the drift. Kettles are depressions on outwash plains, moraines, and other drift deposits. They are typically steep-sided, bowl-shaped depressions with no surface drainage (closed depressions) and commonly contain a lake or swamp. Kettles range in depth from 1 foot to tens of feet and are as much as a few miles in diameter (USDA, 2006). The lower, wetter landscape position of depressions favors hydrophilic vegetation. Plants grow and die, but their decomposition is retarded by wetness and cold. The result is overall organic matter accumulation in place.

Loxley, Beseman, Dawson, Rifle, Lupton, Cathro, and Tawas soils are organic soils in depressional areas, on kettles, in drainageways, or in bogs. A bog is waterlogged, spongy ground consisting primarily of mosses and containing acidic, decaying vegetation (such as sphagnum, sedges, and heaths) that may develop into peat. The mineral soils in the surrounding uplands are generally derived from acid parent materials. The majority of the organic soils (all but Rifle) in Apostle Islands NL are mapped in depressions on disintegration moraines. Slopes range from 0 to 1 percent. Rifle soils occur in low-lying areas of the Julian Bay Tombolo trail (fig. 3). A tombolo is a sand bar, gravel bar, barrier beach, or swamp that connects an island to the mainland or to another island.

Some of the organic soils, such as Rifle and Loxley, are entirely composed of decaying plant material while some, such as Beseman and Dawson, consist of decaying plant material over till or outwash. Organic soils have chemical and physical properties related to the original plants from which they formed. For example, Loxley soils formed in herbaceous organic material, Dawson soils formed in sphagnum moss and herbaceous material, and Lupton soils formed in woody and herbaceous material (see table 5).

The content of soil organic carbon in each major soil for every map unit in the park is shown in table 17. Soil organic carbon (SOC) is carbon (C) in soil that originated

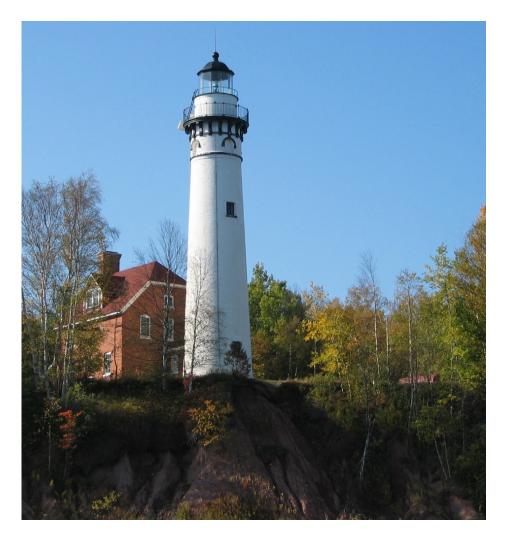


Figure 2.—Outer Island Light is mapped in an area of Morganlake loamy sand, 0 to 6 percent slopes. The Morganlake soil is a very deep, moderately well drained soil that formed in sandy outwash and in the underlying loamy glacial till on moraines. Permeability is moderately rapid or rapid in the sandy mantle and moderately slow or moderate in the till. The brownstone foundation of the lighthouse was quarried from one of the islands.

from a biological source, such as plants, animals, or micro-organisms. SOC makes up about one-half of the weight of soil organic matter. The term soil organic carbon refers only to the carbon occurring in soil organic matter material.

Lupton and Loxley soils have very high SOC levels because they lie in depressions or kettles on disintegration moraines, are saturated throughout the year, and have organic matter that decomposes very slowly. Loxley soils are mapped most extensively on Stockton Island; a large area is delineated in the north-central part of the island. These soils are also mapped in small areas on Michigan, Bear, Sandy, Rocky, and Devil's Islands. They are mapped in complex with Beseman and Dawson soils. Based on soil survey data (see table 17), Loxley soils have 181 kilograms per square meter (to a depth of 2 meters) of soil organic carbon. This amounts to about 805 tons per acre of stored carbon per acre of land that is 100 percent Loxley soils. In contrast, Sedgwick soils have only 10 kg/m² of soil organic carbon even though they lie on the landscape adjacent to Loxley soils, on till plains. The difference is due to the nature of

the alluvial parent material over clayey till of Sedgwick soils and the higher and drier landscape position.

Carbon is withdrawn from the atmosphere through plant growth, and carbon levels subsequently increase in the soil. This process is known as carbon sequestration. Soil carbon sequestration transfers  $\mathrm{CO}_2$  from the atmospheric  $\mathrm{CO}_2$  and  $\mathrm{CH}_4$  greenhouse gases to the soil.

One way SOC becomes sequestered is through a process called humification. In this process, soil organic matter (SOM), such as leaves, wood, roots, and animals, is decomposed and converted to humic substances. Humic substances are broadly defined products of organic matter decomposition that are relatively resistant to further microbial decomposition. Humic substances with a high content of carbon can persist in the soil for hundreds to thousands of years. Examples of humic substances are humic and fulvic acids and humins. Humification is a common process in the park soils occurring in depressions.

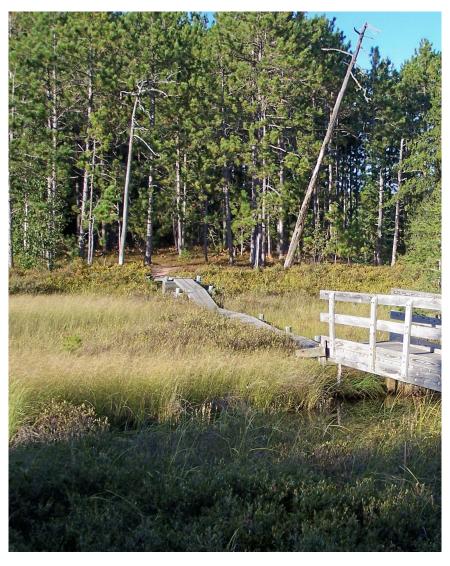


Figure 3.—The Tombolo trail traverses areas mapped as Rifle peat, 0 to 1 percent slopes. Rifle soils are very deep and very poorly drained and formed in organic deposits.

Water can transport both SOC and SIC in soil through the process of eluviation or illuviation. Eluviation is the lateral or downward movement of dissolved or suspended material in soil when rainfall exceeds evaporation. An illuviated zone is where the eluviated materials accumulate. Eluviation is a common soil-forming process in the sandy, humid, forested soils of Apostle Islands NL.

Soil carbon can also be buried. Burial of SOC occurs in different ways. Burial of carbon-containing soil layers limits the exposure of organic carbon to the atmosphere and microbial degradation, thus preserving that in the soil. Flooding can periodically bury and cover old soil surface horizons with new sediment, thus preserving the soil organic carbon.

Erosion is a natural process in soils. Removal of soil from one place often results in burial of soil in another place. Burial of soil horizons that contain soil organic matter sequesters that carbon in the soil. Burial of carbon by dunes or landslides along the bluffs is a common process in the park.

#### **Alluvium**

Alluvium is parent material deposited by running water. It can have different textures, depending on whether the water moves quickly or slowly. The types of rocks occurring in the source region of the streams and rivers also determine characteristics of the alluvium. Fast-moving water deposits gravel, cobbles, and sand. Slow-moving water leaves finer textured deposits (clay and silt) when sediments in the water settle out. In Apostle Islands NL, Meehan, Arnheim, and Moquah soils formed in recent alluvium on flood plains receiving deposits during the last 10,000 years (Holocene age). Meehan soils are associated with beaches on Long, Stockton, and Rocky Islands. Arnheim soils are mapped on Stockton, Outer, and Sand Islands and along the mainland. Moquah soils are mapped on the southern tip of the mainland unit of the park. Both Arnheim and Moquah soils are on flood plains that are frequently flooded and are of minor extent in the park.

#### Climate

Differences in climate can result in differences in soils. Temperature and moisture influence soil formation and are the two most commonly measured features of climate. Weathering is most active when soils are moist and warm because these soil conditions are conducive to rapid chemical reactions and increased biological activity in the soil. Cooler temperatures result in slower chemical reactions. While average temperatures and amounts of precipitation are important in determining soil properties, the extremes of climate in any given locale also play a major role in soil formation.

The climate in Apostle Islands NL is cool and humid. Present-day climate variations are the result of topography and relief and distance from the lakes. The general climate is uniform throughout the area, but miroclimates are modified locally by the proximity to Lake Superior. Table 5 gives the mean annual precipitation in the park, and table 19 lists the occurrence of soil saturation or wetness (i.e., depth to water table) for each of the soils. Probable occurrences of flooding and ponding are also listed in table 19.

During periods of rainfall or snowmelt, water carrying dissolved or suspended solids moves through the soil in a process called leaching. Leaching becomes active with the onset of rainfall or snowmelt. Different temperatures and moisture amounts cause different patterns of weathering and leaching in the soil. Colder temperatures result in less chemical weathering. Soil that is frozen part of the year has decreased microbial growth and decreased vegetation. The colder temperatures, however, aid in mechanical weathering due to expansion as water freezes in the soil. Seasonal and daily changes in temperature affect moisture effectiveness, biological activity, rates of chemical reactions, and the kinds of vegetation. Fluctuations in temperature and moisture affect the rate of organic matter production, decomposition, and accumulation and the weathering of minerals.

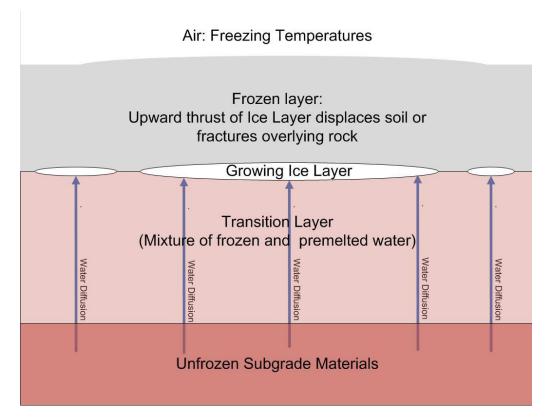


Figure 4.—Diagram illustrating ice lens formation in soils, which results in frost heave or frost action. (Image is from Williamborg [2009].)

Fluctuations in moisture and temperature can also result in frost action. Frost action (or frost heave) results from ice forming beneath the soil surface during atmospheric freezing conditions. The ice grows in the direction of heat loss, which is vertically toward the surface, starting at the freezing boundary in the soil. A water supply is needed to keep the ice crystals growing. The growing ice is restrained by overlying soil, which applies a load that limits its vertical growth and promotes the formation of a lens-shaped area of ice within the soil (fig. 4). The processes of frost heave were more intense during past glacial times than they are today.

A few of the soils in the park have a high potential for frost action, and many have a moderate potential. Frost heave is a natural pedogenic process that mixes and breaks up the soil surface. Table 20 lists the frost heave potential, or frost action, as low, moderate, or high. Some of the soils rated with a high potential for frost action in the park are Lerch, Sedgwick, Munuscong, Lupton, Cathro, Tawas, Arnheim, and Tonkey. These soils are saturated for much of the year, which drives the high frost action.

Frost heave can cause road potholes and cracked pavements and foundations. Table 9 lists the map units and soils that have a limitation for roads and streets due to frost action. This limitation results in higher maintenance costs for park roads and parking lots.

#### **Organisms**

Plants, animals, micro-organisms, and humans affect the formation and shape of soils. Plants capture solar energy via photosynthesis and transfer that energy to the soil, energy that is a fundamental driver of many soil processes. Abandoned animal burrows commonly are filled with loose material from the overlying horizons and

transmit water more readily than the surrounding undisturbed soil material. Fungi and bacteria are the primary organisms that decompose organic matter and add nutrients to the soil. Organisms decompose leaves and mix them with the upper part of the soil, resulting in the cycling of nutrients and energy back to vegetation. Micro-organisms affect chemical exchanges between roots and soil. Animals and micro-organisms mix soils and form burrows and pores.

Humans also mix the soil extensively with land management practices such as creating, maintaining, and using roads and trails. Soils in Apostle Islands NL were plowed and mixed for agriculture in the past.

The sand dunes of the park provide a distinctive environment for vegetation. Long roots and dense rhizomes of dune grasses seek out water and help hold the dunes together. Grass roots are fibrous and decompose, adding organic matter and nitrogen to the soil. Thistles, bearberries, and other drought-resistant plants also contribute to dune stability.

Plant roots also help to develop soil structure and aggregate stability. Beach grass and sand cherry are among the first plants to grow on young dunes. Dune grass, Lake Huron tansy, jack pine, and balsam poplar are also common in the dunes. These plants play an important role in dune development. They help build dunes by acting as obstacles that slow sand-laden wind and force it to drop the sand. If a strong wind succeeds in stripping plants from a dune, a bowl-shaped blowout may form in the exposed area. Some dunes migrate, pushed by the wind, and sometimes shifting sands bury trees.

Changes in lake levels coupled with wind and wave regimes drive the geomorphic changes that have influenced coastal vegetation and soil patterns in the park. Many rare or relict plant communities and specific animal species occur within some coastal-zone dune areas.

The large plants of the forested ecosystem of Apostle Islands NL affect soil formation. Besides the mechanical breaking of rocks by large tree roots, the trees capture energy and substance through photosynthesis and then, by the decomposition of plant residue, form organic-mineral complexes that are recycled many times within the ecosystem (Buol et al., 2011).

Differences in natural soil drainage and in parent material affect the composition of vegetation. Apostle Islands NL is located at the northern limit of the hemlock-white pine-northern hardwood forest and the southern limit of the boreal forest and is 96 percent forested (based on a coastal report). This forest type is a transitional area from the more homogeneously deciduous forests to the south and the coniferous boreal forests to the north. The park is dominated with white spruce (*Picea glauca*) and balsam fir (*Abies balsamea*). These plants are commonly mixed with white birch (*Betula papyrifera*), northern white cedar (*Thuja occidentalis*), white pine (*Pinus strobus*), balsam poplar (*Populus balsamifera*) and quaking aspen (*Populus tremuloides*).

On Madeline Island, Stockton Island, and several other islands, a unique bogdune ecosystem exists near bays and enclosed lagoons. The bogs are made up of Loxley, Beseman, Dawson, and Rifle soils. The dunes commonly include Grayling and Wurtsmith soils on beach ridges and Psammaquents (such as Meehan soils) in depressions.

Apostle Islands NL is officially home to 5 plant species currently considered endangered in Wisconsin, including satiny willow (*Salix pellita*); 12 plant species currently considered threatened, including coastal sedge (*Carex exilis*), lenticular sedge (*Carex lenticularis*), Michaux's sedge (*Carex michauxiana*), drooping sedge (*Carex prasina*), broad-leaved twayblade (*Listera convallarioides*), flat-leaved willow (*Salix planifolia*), and narrow false oats (*Trisetum spicatum*); and 23 plant species of special concern (USDI-NPS, 2013)

Before human settlement, about 90 percent of the islands were covered by an upland mixed coniferous/hardwood forest dominated by hemlock (*Tsuga canadensis*), white pine (*Pinus strobus*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), and white birch (*Betula papyrifera*). Boreal forest species include white spruce (*Picea glauca*), balsam fir (*Abies balsamea*), tamarack (*Larix laricina*), white cedar (*Thuja occidentalis*), white birch (*Betula papyrifera*), and quaking aspen (*Populus tremuloides*). Additional plant communities include those of sandscapes (dunes, pine savannas, forests, and bogs), alder thickets and beaver flowages, clayscapes, rockscapes, and disturbed areas (Judziewicz and Koch, 1993).

Plant litter, whether leaves, needles, stems, or bark, helps prevent nutrient loss, conserves soil moisture, reduces raindrop impact, and limits frost penetration. Vegetation increases soil stability by protecting the surface against wind and water erosion.

#### Time

Time for parent material, climate, organisms, and topography to interact with the soil is also a soil-forming factor. Over time, soils exhibit features that reflect the interaction of other soil-forming factors. Recently deposited material, such as material deposited by a flood, exhibits no features from soil development activities and its properties are mostly inherited from the new material. The previous soil surface and underlying horizons become buried. The time clock resets for these soils. The different horizons in a soil profile and the degree of development can be directly related to time. Terraces above the active flood plain, while similar in origin to the flood plain, are older land surfaces of old abandoned flood plains and thus have soils with more horizon development.

Many soils in the park have little soil development because they have only been forming since the last glaciation. For example, Au Gres soils have a thin O horizon and a thin A horizon over pale brown sand. Where accumulation and translocation of organics, iron, aluminum, and clay have occurred, a colorful profile may form. Soils that have a colorful profile due to translocation include the Spodosols in the park (see table 22). Figure 1 is a profile of an Au Gres soil, a Spodosol, that has evident translocation.

#### Topography and Relief

Topography refers to the shape of the landscape, and relief refers to differences in elevation. The overall landscape in a park, whether it consists of pitted outwash plains, hummocky dune hills, or level lake terraces, is the result of erosion and depositional processes. These processes may have occurred in response to changes in climate. fluctuating sea levels, glaciations, tectonic activities, and/or isostatic rebound. (Isostatic rebound is the elevation of the land surface after the weight of glacial ice has been removed.) Cyclic periods of landscape stability and instability influence the types of soils that form. Development of the current landscape in the park occurred during the last glaciation, approximately 10,000 years ago. The age of soils can be estimated from the age of geomorphic surfaces, such as the age of till and outwash. The youngest geomorphic surfaces generally are flood plains. In areas where sandy alluvium has been deposited, hydric soils commonly are located (see table 4), soils sometimes flood, or ground water is relatively close to the surface. The locations of hydric soils are influenced by topography and relief. Hydric soils are also in low relief depressions and marshes. Most of these soils in Apostle Islands NL are in depressions on outwash, till, lake plains, and moraines.

Slope and aspect of the overall landscape can affect the moisture and temperature of the soil. Steep slopes on moraines, drumlins, or dunes facing the sun are warmer

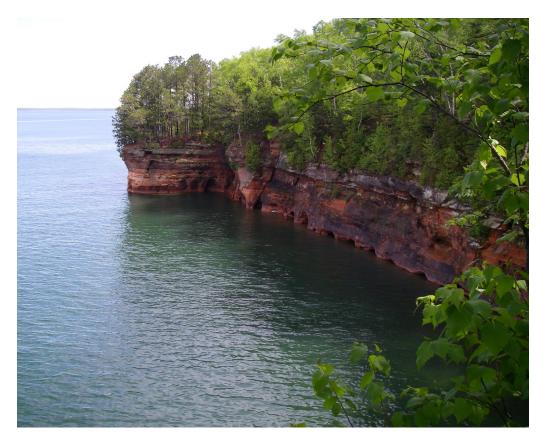


Figure 5.—Udorthents, ravines and escarpments, 25 to 60 percent slopes, occur along the edges of the Mawikwe Bay shoreline.

than those facing away from the sun. Steep soils may be eroded and lose their surface horizons as they form. Steep soils along the lakeshore in the area of cliffs are mapped Udorthents and are shallow under forested vegetation (fig. 5). As a result, these soils may be shallower than the more nearly level ones that receive deposits from areas upslope, such as along some of the landslide areas of the park. Thicker, darker soils may be expected on the bottom land or in depressions on lake plains or moraines. Relief and topography also influence the location of prime farmland map units. Table 3 lists the map units considered prime farmland or farmland of local importance in the park. Generally, prime farmland soils are in level or gently rolling areas and are thick.

#### **Processes of Soil Horizon Differentiation**

A soil profile reflects the activities of the five soil-forming factors. A succession of layers or horizons is formed, extending from the surface down to the parent material. The horizons differ in one or more properties, such as thickness, color, texture, structure, consistence, porosity, and reaction (pH).

Several major processes are involved in the formation of soil horizons. In Apostle Islands National Lakeshore, the main soil-forming processes are illuviation, eluviation, podzolization, enrichment, decomposition, humification, and cumulization.

*Illuviation* is the movement of material *into* a horizon from another horizon, and *eluviation* is the movement of material *from* a portion of the soil or horizon. Formation of an argillic horizon (Alfisols) is an example of eluviation and illuviation and is

common in many soils in the park. This formation occurs as the clayey fine particles are translocated through the profile with the wetting front from water percolation, resulting in an accumulation of clay in the underlying B horizon.

Podzolization is another process of illuvation and eluviation in which aluminum and iron and/or organic matter are moved through, or *translocated* through, the profile. Podzolization includes the translocation of Al and Fe (due to the presence of acidic organic compounds such as humic and fulvic acids), resulting in the chelating of the metallic ions into organo-metallic complexes. The humus-metal complexes are concentrated into an *illuviated* horizon. Concentration of silica may occur in the layer *eluviated* (Buol et al., 2011). The acidic pine litter is important to podzol formation in northern soils. A large percentage of the soils in the park have podzolization as a major soil-forming process. These processes are identifiable in taxonomic classification (Spodosols) and by chemical and physical properties.

*Enrichment* is another process of additions to the soil and is often used in describing organic matter enrichment to the soil surface.

*Decomposition* is the breakdown of mineral and organic materials to weathering by-products.

Humification is the transformation of organic matter into humic substances. Humic substances are broadly defined products of organic matter decomposition that are relatively resistant to further microbial decomposition. Humification is a type of *decomposition*.

Cumulization is the process in which mineral particles are added to the soil. An example would be the cumulization of eolian material in the soils near Cat Island spit.

An excellent example soil for the discussion of soil-forming processes is the Au Gres series. Au Gres soils are mapped on the mainland unit of the park near Sand Bay. These soils are classified as Spodosols. Spodosols are extensive in the United States in cool, humid climates and in areas of quartz-rich sands, which may have fluctuating water tables. They also may have snow cover, which during a spring thaw flushes the soil with water. Most areas are covered by coniferous vegetation or a mix of hardwoods and conifers. Au Gres soils formed in sandy outwash deposits and occur mostly on outwash plains. The soil-forming processes discussed above are shown in italics in the following discussion.

In Au Gres soils (see figure 1), the 3 inches of surface soil has been *enriched* by organic material. Below the organic surface is a horizon that has been *eluviated*. This is evidenced by the light gray zone that extends to a depth of about 9 inches. This light-colored zone is called an albic horizon. Some of the gray material is in small tongue-shaped pockets that extend to deeper depths. Any organics that have been *decomposed* and *humified* in this *eluviated* zone have been moved to an *illuviation* zone. The *illuviation* zone has the darkest colors in the profile and also has a tongue shape at depth. A dark tongue of spodic material visible in the photograph, on the left side of the tape, extends to a depth of just over 1 foot. The illuviated material is called spodic material and forms a spodic horizon.

Soil profiles consist commonly of five major horizons—O, A, E, B, and C horizons. The O horizon consists of decomposing organic materials. The A horizon is a mineral horizon that has a content of organic matter that is greater than that of underlying horizons but less than that of overlying O horizons. The A horizon may be the surface layer if there is no O horizon.

The E horizon is a zone of maximum eluviation of materials. E horizons typically occur in wetter climates or under wetter soil conditions on certain landscapes and may overlie a B horizon. The E horizon is commonly pale or white because it has been stripped of all soil constituents that provide color.

The B horizon is a zone of accumulation of clay, iron, aluminum, or organic matter. B horizons are common in the park. Color plays an important part in distinguishing

B horizons. The B horizon is the horizon of maximum accumulation of dissolved or suspended materials, such as iron, clay, or organic materials.

The C horizon is in the bottom part of a soil profile (it cannot be in figure 1). It is little affected by the soil-forming processes and is most related to the parent material.

These processes and sequences of horizonation are commonly seen in some soils in the park classified as Spodosols. Spodosols, which are common in the park, include Tula, Kinross, Zeba, Iosco, Flink, Kellogg, Croswell, Sedgwick, Allendale, Gogebic, and Wakefield soils (see table 22).

#### Classification of the Soils

Soils are named and classified on the basis of physical and chemical properties in their horizons (layers). Color, texture, structure, and other properties of the soil to a depth of 2 meters are used to key the soil into a classification system. This system helps people to use soil information and also provides a common language for scientists.

Soils and their horizons differ from one another, depending on how and when they formed. Soil scientists use the five soil-forming factors to help predict where different soils may occur. The degree and expression of the soil horizons reflect the extent of interaction of the soil-forming factors with one or more of the soil-forming processes (Simonson, 1959).

When mapping soils, a soil scientist looks for areas with similar soil-forming factors to find similar soils. The properties of the soils are described. Soils with the same kind of properties are given taxonomic names. Soils are classified, mapped, and interpreted on the basis of various kinds of soil horizons and their arrangement. The distribution of soil orders corresponds with the general patterns of the soil-forming factors within the park.

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2010). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The categories are defined in the following paragraphs.

ORDER. Soil taxonomy at the highest hierarchical level identifies 12 soil orders. The names for the orders and taxonomic soil properties relate to Greek, Latin, or other root words that reveal something about the soil. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Spodosol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. Sixty-four suborders are recognized at the next level of classification. The last syllable in the name of a suborder indicates the order. An example is Orthod (*Orth* meaning common, plus *od*, from Spodosol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. There are about 300 great groups. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haplorthods (*Hapl*, meaning minimal horizonation, plus *Orthod*, the suborder of the Spodosols that is common).

SUBGROUP. There are more than 2,400 subgroups. Each great group has a typic subgroup. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Other subgroups are intergrades or extragrades.

Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplorthods.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties for family placement are those of horizons below a traditional agronomic plow depth. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is sandy-skeletal, mixed, frigid Typic Haplorthods.

SERIES. The soil series is the lowest category in the soil classification system. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile.

Most parks are mapped to the series level. The names of soil series are selected by the soil scientists during the course of mapping. An example is the Brownstone series, which is classified as a sandy-skeletal, mixed, frigid Typic Haplorthod. The series names are commonly geographic place names or are coined.

Because of access limitations and soil variability, soils in some remote areas are classified at the great group or subgroup level.

Table 21 indicates the order, suborder, great group, subgroup, and family of the soil series in the park. Table 22 displays the classification as a key sorted by order.

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# **Glossary**

- **Aeration, soil.** The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.
- **Aggregate, soil.** Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.
- **Alkali (sodic) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.
- **Alluvial fan.** The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.
- Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.
- **Alpha,alpha-dipyridyl.** A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redoximorphic feature.
- **Aquic conditions.** Current soil wetness characterized by saturation, reduction, and redoximorphic features.
- **Argillic horizon.** A subsoil horizon characterized by an accumulation of illuvial clay. **Aspect.** The direction in which a slope faces.
- Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

- **Base saturation.** The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.
- **Bedrock.** The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.
- Canopy. The leafy crown of trees or shrubs. (See Crown.)
- **Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.
- Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.
- **Clay.** As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

- **Claypan.** A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.
- **Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.
- Coarse textured soil. Sand or loamy sand.
- **Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.
- **Complex, soil.** A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.
- **Control section.** The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.
- **Corrosion.** Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.
- **Crown.** The upper part of a tree or shrub, including the living branches and their foliage.
- **Culmination of the mean annual increment (CMAI).** The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.
- **Depth, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.
- Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained, and very poorly drained. These classes are defined in the "Soil Survey Manual."
- Drainage, surface. Runoff, or surface flow of water, from an area.
- **Ecological site.** An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.
- **Eluviation.** The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.
- **Eolian soil material.** Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.
- **Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep. *Erosion* (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building

up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

*Erosion* (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

**Escarpment.** A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

**Fertility, soil.** The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

**Fill slope.** A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

**Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

**Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.

Forb. Any herbaceous plant not a grass or a sedge.

**Forest cover.** All trees and other woody plants (underbrush) covering the ground in a forest.

**Forest type.** A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

**Gravel.** Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

**Gravelly soil material.** Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

**Ground water.** Water filling all the unblocked pores of the material below the water table.

**Hard bedrock.** Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

**Hill.** A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

*E horizon.*—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

*B horizon*.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

*C horizon.*—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

*R layer.*—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

- **Hydrologic soil groups.** Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.
- **Illuviation.** The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.
- **Infiltration.** The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.
- **Infiltration capacity.** The maximum rate at which water can infiltrate into a soil under a given set of conditions.
- **Infiltration rate.** The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.
- Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	

**K**<sub>sat</sub>. Saturated hydraulic conductivity. (See Permeability.)

**Leaching.** The removal of soluble material from soil or other material by percolating water.

**LEP.** See Linear extensibility percent.

Linear extensibility (LE). Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at ¹/₃- or ¹/₁₀-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

**Linear extensibility percent.** Refers to the percent change in linear extensibility. **Liquid limit.** The moisture content at which the soil passes from a plastic to a liquid state.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

**Loess.** Fine grained material, dominantly of silt-sized particles, deposited by wind.

**Low strength.** The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

**Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

**Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.

**Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

**Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

**Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

**Organic matter.** Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

**Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

**Ped.** An individual natural soil aggregate, such as a granule, a prism, or a block.

**Pedon.** The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Percolation.** The movement of water through the soil.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Extremely slow	0.0 to 0.01 inch
	0.01 to 0.06 inch
	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
	more than 20 inches

**Phase, soil.** A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

**Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.

**Plowpan.** A compacted layer formed in the soil directly below the plowed layer.

**Ponding.** Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

**Poorly graded.** Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

**Potential rooting depth (effective rooting depth).** Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

**Productivity, soil.** The capability of a soil for producing a specified plant or sequence of plants under specific management.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

**Rangeland.** Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

**Reaction, soil.** A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

**Redoximorphic concentrations.** Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

**Redoximorphic depletions.** Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

**Redoximorphic features.** Redoximorphic concentrations, redoximorphic depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

**Relief.** The elevations or inequalities of a land surface, considered collectively. **Residuum (residual soil material).** Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

**Rock fragments.** Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

**Root zone.** The part of the soil that can be penetrated by plant roots.

**Runoff.** The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called groundwater runoff or seepage flow from ground water.

**Saline soil.** A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

- **Sand.** As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.
- **Sandstone.** Sedimentary rock containing dominantly sand-sized particles.
- **Saprolite.** Unconsolidated residual material underlying the soil and grading to hard bedrock below.
- **Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.
- **Sedimentary rock.** Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.
- **Series**, **soil**. A group of soils that have profiles that are almost alike. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.
- **Shale.** Sedimentary rock formed by the hardening of a clay deposit.
- **Silt.** As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.
- **Siltstone.** Sedimentary rock made up of dominantly silt-sized particles.
- **Similar soils.** Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.
- **Site index.** A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.
- **Slope.** The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.
- **Sodic (alkali) soil.** A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.
- **Sodicity.** The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na<sup>+</sup> to Ca<sup>++</sup> + Mg<sup>++</sup>. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
•	13-30:1
Strong	more than 30:1

- **Sodium adsorption ratio (SAR).** A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.
- **Soft bedrock.** Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.
- **Soil.** A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.
- **Soil separates.** Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clav	less than 0.002

- **Solum.** The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.
- **Stone line.** A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.
- **Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.
- **Stony.** Refers to a soil containing stones in numbers that interfere with or prevent tillage.
- Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—platy (laminated), prismatic (vertical axis of aggregates longer than horizontal), columnar (prisms with rounded tops), blocky (angular or subangular), and granular. Structureless soils are either single grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).
- **Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth. **Substratum.** The part of the soil below the solum.
- **Subsurface layer.** Any surface soil horizon (A, E, AB, or EB) below the surface layer. **Surface layer.** The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."
- **Surface soil.** The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.
- **Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.
- **Terrace** (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.
- **Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay, and clay. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."
- **Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.
- **Topsoil.** The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.
- **Upland.** Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

- **Weathering.** All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.
- **Well graded.** Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

# **Tables**

Table 1.-Soil Legend

Map unit symbol and map unit name	Components in	Percent   of
<del></del>	map unit	map unit
133292: Lerch-Herbster complex, 0 to 3 percent slopes	  Lerch	   50
	  Herbster	35
	  Munuscong	   5
	Pickford	5
	  Shag	   5 
33296: Cublake-Croswell-Ashwabay complex, 0 to 6 percent slopes	  -  Cublake	     35
	  Croswell	   20
	  Ashwabay	l l 20
	  Rubicon	1 10
	  Flink	   5
	  Sayner	   5
	  Sultz	5
133299: Cublake-Croswell-Ashwabay complex, 6 to 15 percent slopes	    Cublake	     35
	  Croswell	   20
	  Ashwabay	I I 20
	1	10
	Rubicon	i
	Flink 	5 
	Sayner	5 
	Sultz	J 5
33300: Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes	 - Kellogg	   35
	  Allendale	   25
	  Ashwabay	l l 20
	  Portwing	l   8
	  Cublake	1 7
	  Wakeley	   5

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
433301: Kellogg-Allendale-Ashwabay complex, 6 to 15 percent slopes	    Kellogg	     40
	    Allendale	1 25
	  Ashwabay	20
	    Portwing	   7
	  Cublake	   5
	  Wakeley 	   3
433304: Sedgwick-Munuscong complex, 0 to 6 percent slopes	    Sedgwick	     50
	  Munuscong  -	30
	  Allendale	l   8
	  Superior 	l   5
	  Herbster	4
	  Pickford 	   3 
433305: Superior-Sedgwick complex, 0 to 6 percent slopes	    Superior	   50
	  Sedgwick	30
	  Allendale	10
	  Portwing	   5
	  Munuscong  -	   3
	  Herbster 	   2 
433309: Superior-Sedgwick complex, 6 to 15 percent slopes	    Superior	   50
	  Sedgwick 	30
	  Kellogg 	1 10
	  Cornucopia 	5
	  Allendale 	] 3
	  Lerch 	   2 
433310: Sultz-Ashwabay-Rubicon complex, 15 to 45 percent slopes	  Sultz	   35
	  Ashwabay 	25
	  Rubicon	20
	  Sayner 	   10
	  Cublake 	   5
	  Manistee 	   5 

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
433314:	 	!
Manistee-Kellogg-Ashwabay complex, 15 to 45 percent slopes	1	40 
	Kellogg 	30 
	Ashwabay 	20 
	Superior	4
	Cornucopia 	3 
	Sultz 	3 
433326: Rubicon sand, 0 to 6 percent slopes	 - Rubicon	   85
	Croswell	5
	  Karlin	   5
	  Sayner	] 3
	  Sultz 	   2
433379: Allendale loamy fine sand, 0 to 3 percent slopes	  -  Allendale	   80
	  Kellogg	   6
	  Flink	   5
	  Wakeley	   5
	  Herbster	   2
	  Sedgwick	   2
433515:	1	 
Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes	- Lupton 	40 
	Cathro	30 
	Tawas 	25 
	Seelyeville 	5 
433572: Portwing-Herbster complex, 0 to 6 percent slopes	 - Portwing	l l 50
	  Herbster	l   30
	  Cornucopia	   5
	  Lerch	   5
	  Sanborg	l l 3
	  Sedgwick	l l 3
	  Allendale	   2
	INTIGNATE	•

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	Components in   map unit	Percent   of   map unit
433573:	1	 
Cornucopia silt loam, 6 to 15 percent slopes	Cornucopia 	80 
	Manistee 	] 5 ]
	Odanah 	5 
	Portwing	5 I
	Superior	5 
433582: Croswell sand, 0 to 6 percent slopes	  Croswell	   82
oroswerr band, o do o percent bropes	  Ashwabay	02     5
	  Au Gres	     5
	i	i
	Cublake	] 5 
	Rubicon 	3 
433599: Annalake fine sandy loam, lake terrace, 2 to 6 percent slopes	  Annalake	   85
	  Alcona	   5
	  Robago	   5
	  Cublake	   3
	  Neconish	   2
433600:	1	I I
Annalake fine sandy loam, lake terrace, 6 to 15 percent slopes	Annalake	80
	Alcona	5
	Karlin	,   5
	Neconish	5
	Robago	5
433671:	 	
Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded	1	85 
	Dechamps	10 
	Moquah 	5 
433676: Redrim very cobbly sand, 0 to 6 percent slopes, very stony	  Redrim	   85
	  Brownstone	   5
	  Deerton	   5
	  Abbaye	l   3
	  Zeba	   2
	i	 İ

Table 1.—Soil Legend—Continued

Zeba sandy loam, 0 to 6 percent slopes, very stony	Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
Lapoin loam, 0 to 6 percent slopes	433679:	1	1
Brownstone   4     Zeba   3   3   3   3   3   3   3   3   3		Lapoin	85 
Zeba   3   3   3   3   3   3   3   3   3		Abbaye	. 8
### ### #### #########################		Brownstone	4
Zeba sandy loam, 0 to 6 percent slopes, very stony		Zeba	] 3
Abbaye   5	433686:		
Deerton   5	Zeba sandy loam, 0 to 6 percent slopes, very stony	Zeba 	90 
### Sultz sand, 0 to 6 percent slopes		Abbaye 	5 
Sultz sand, 0 to 6 percent slopes		Deerton	5 
Karlin   5	433729: Sultz sand, 0 to 6 percent slopes	  Sultz	   85
Rubicon   5		  Cublake	   5
### ### ### ### ### ### ### ### ### ##		  Karlin	   5
Moquah fine sandy loam, 0 to 3 percent slopes, frequently flooded		  Rubicon	   5
Dechamps   10	433739:	I I	1
Arnheim   5		Moquah	85
### ### ##############################		Dechamps	1 10
Beaches, 2 to 12 percent slopes		  Arnheim	   5
Psammaquents   3			!
433802: Udorthents, ravines and escarpments, 25 to 60 percent slopes	Beaches, 2 to 12 percent slopes	Beaches 	97 
Udorthents, ravines and escarpments, 25 to 60 percent slopes		Psammaquents	] 3 ]
Moquah   5		ravines and	   85   
452739: Water		  Alcona	   5
452739:		  Moquah	   5
Water		  Odanah	   5
Abbaye-Lapoin complex, 0 to 6 percent slopes Abbaye   55		    Water 	     100 
	452765: Abbaye-Lapoin complex, 0 to 6 percent slopes	  Abbaye	   55
		  Lapoin	   40
		  Zeba	   5

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1383557:		
Au Gres loamy sand, 0 to 3 percent slopes	I	85 
	Croswell	] 5 ]
	Kinross	] 5 ]
	Flink 	] 3 ]
	Chinwhisker 	2 
1383580: Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes	  Loxley	   40
	  Beseman	I I 30
	  Dawson	   28
	  Uskabwanka	1 2
1383581: Rifle peat, 0 to 1 percent slopes	    Rifle	     90
	  Dawson	l l 5
	  Loxley	l   5
1383603: Cornucopia silt loam, 15 to 45 percent slopes	    Cornucopia	     80
	  Manistee	I I 5
	  Moquah	   5
	  Odanah	   5
	  Portwing	   5
1383658:		
	Deerton	50
	Brownstone	40
	Redrim	5
	Zeba	] 3
	  Abbaye 	2
1383660: Deerton-Brownstone complex, 6 to 15 percent slopes, very stony	  Deerton	     50
	  Brownstone	   40
	  Redrim	   5
	  Abbaye	l   3
	  Zeba	   2

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1383662: Abbaye loamy sand, 6 to 15 percent slopes	    Abbaye 	     90
	Deerton	,   5
	Zeba 	5 
1383665: Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes	  Allendale	   35 
	Wakeley 	30 
	Kinross	20 
	Flink	5 
	Sedgwick	5 
	Tawas	,   5 
1383960: Flink sand, 0 to 3 percent slopes	    Flink	   75
	Allendale	,   5
	Au Gres	,   5
	Cublake	,   5
	Kinross	,   5
	Robago	,   5
1444357: Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded	  Arnheim	     85
	Dechamps	10
	Moquah	5 
1444359: Beaches, 2 to 12 percent slopes	  Beaches	   97 
	Psammaquents	3
1444367: Udorthents, ravines and escarpments, 25 to 60 percent slopes	  Udorthents,   ravines and   escarpments	   85   
	  Alcona 	   5
	  Moquah 	   5 
	  Odanah 	   5
1444378: Wakefield fine sandy loam, 1 to 6 percent slopes, stony	    Wakefield 	     85
	  Tula 	1 10
	  Morganlake 	   5 

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1444379:	] 	 
Wakefield fine sandy loam, 6 to 18 percent slopes, stony	- Wakefield 	85 
	Morganlake	5
	Odanah	5
	Tula	5
1444388: Allendale loamy fine sand, 0 to 3 percent slopes	  - Allendale	80
	  Kellogg	6
	  Flink	j j 5
	  Wakeley	j j 5
	  Herbster	1 2
	  Sedgwick	1 2
1444402: Tonkey sandy loam, 0 to 2 percent slopes	   - Tonkey	     90
	  Robago 	6
	Shag	4
1444410: Tula fine sandy loam, 1 to 6 percent slopes, stony	  - Tula	   80
	  Gogebic	10
	Pleine	5
	  Iosco	3
	  Herbster	2
1444414: Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes	  -  Lupton	     40
	Cathro	30
	  Tawas	25
	  Seelyeville	   5
1444425: Lerch-Herbster complex, 0 to 3 percent slopes	  -  Lerch	     50
	  Herbster	   35
	  Munuscong	   5
	  Pickford	   5
	  Shag	   5

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1444426:	1	 
Portwing-Herbster complex, 0 to 6 percent slopes	1	50 
	Herbster 	30 
	Cornucopia 	5 
	Lerch 	5 
	Sanborg 	3 
	Sedgwick	3 
	Allendale	2
	Badriver	2
1444427: Cornucopia silt loam, 6 to 15 percent slopes	  Cornucopia	     80
	  Manistee	   5
	  Odanah	l   5
	  Portwing	   5
	  Superior	   5
1444428: Cornucopia silt loam, 15 to 45 percent slopes	    Cornucopia	     80
	  Manistee	   5
	  Moquah	l   5
	  Odanah	l   5
	  Portwing	   5
1444431:		i I
Croswell sand, 0 to 6 percent slopes	Croswell	82
	  Ashwabay	j j 5
	Au Gres	l   5
	  Cublake	l   5
	  Rubicon	   3
1444432:		 
Gogebic fine sandy loam, 1 to 6 percent slopes, very stony	Gogebic 	85 
	Tula 	10 
	Morganlake 	J 5
1444435: Iosco loamy sand, 0 to 4 percent slopes	  Iosco	   85
	  Allendale	I   5
	  Morganlake	l   5
	  Tonkey	l I 5
	1	I

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1444457:		] 
Redrim very cobbly sand, 0 to 6 percent slopes, very stony	- Redrim 	85 
	Brownstone	5 
	Deerton	5
	Abbaye	3
	Zeba	2
1444459: Zeba sandy loam, 0 to 6 percent slopes, very stony	'   - Zeba	     90
Zeba Sandy Toam, 0 to 0 percent stopes, very stony	İ	İ
	Abbaye 	] 5    -
	Deerton 	5 
1444460: Abbaye-Lapoin complex, 0 to 6 percent slopes	 - Abbaye	   55
	  Lapoin	   40
	  Zeba	   5
1444461:		 
Abbaye-Zeba complex, 0 to 6 percent slopes, very stony	- Abbaye 	55 
	Zeba 	40 
	Lapoin	5
1444477: Cublake-Croswell-Ashwabay complex, 0 to 6 percent slopes	'   - Cublake	   35
captaine closured insurabay complete, v to v percent bropes	  Croswell	     20
	İ	İ
	Ashwabay 	20 
	Rubicon	10 
	Flink 	5 
	Sayner 	5 
	Sultz 	5 
1444478: Cublake-Croswell-Ashwabay complex, 6 to 15 percent slopes	 - Cublake	l l 35
	  Croswell	   20
	  Ashwabay	l   20
	  Rubicon	1 10
	  Flink	     5
	  Sayner	     5
	1	İ
	Sultz 	5 

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1444479:	 	 
Morganlake loamy sand, 0 to 6 percent slopes	Morganlake	85
	losco	5
	  Kellogg	5
	  Menominee	   5
1444480:	 	 
Morganlake loamy sand, 6 to 15 percent slopes	Morganlake	85 
	Iosco	5
	Kellogg	5
	  Menominee	5
1444481:	 	 
Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes	Kellogg 	35 
	Allendale	25
	Ashwabay	20
	  Portwing	8
	  Cublake	   7
	  Wakeley	   5
1444482:	 	1
Kellogg-Allendale-Ashwabay complex, 0 to 15 percent slopes	Kellogg	40
	Allendale	25
	  Ashwabay	1 20
	  Portwing	1 7
	  Cublake	   5
	  Wakeley	   3
1444486:	1	1
Sedgwick-Munuscong complex, 0 to 6 percent slopes	Sedgwick	50
	Munuscong	30
	  Allendale	   8
	  Superior	   5
	  Herbster	   4
	    Pickford	   3
	 	i

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1444487: Superior-Sedgwick complex, 0 to 6 percent slopes	   - Superior	     50
	  Sedgwick	I I 30
	  Allendale	   10
	  Portwing	   5
	  Munuscong	   3
	  Herbster	   2 
1444488: Superior-Sedgwick complex, 6 to 15 percent slopes	  - Superior	   50
	  Sedgwick	30
	  Kellogg	1 10
	  Cornucopia	   5
	  Allendale	] 3
	  Lerch	   2
1444489: Sultz-Ashwabay-Rubicon complex, 15 to 45 percent slopes	   - Sultz	     35
	  Ashwabay	   25
	  Rubicon	l l 20
	  Sayner	   10
	  Cublake	   5
	  Manistee	l l 5
1444492:		 
Manistee-Kellogg-Ashwabay complex, 15 to 45 percent slopes	- Manistee 	40 
	Kellogg 	30 
	Ashwabay 	20 
	Superior 	4 
	Cornucopia 	3 
	Sultz 	3 
1444506: Keweenaw, stony-Rubicon complex, 0 to 6 percent slopes	 - Keweenaw 	   60 
	  Rubicon	30
	  Cublake 	1 10
1444507: Keweenaw, stony-Rubicon complex, 6 to 15 percent slopes	  -  Keweenaw	   60
	  Rubicon	I I 30
	  Cublake	   10

Table 1.—Soil Legend—Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
***************************************	İ	<u> </u>
1444585:  Meehan sand, beaches, 0 to 2 percent slopes	 - Meehan, beaches	I I 90
	  Newson, beaches	   5
	  Wurtsmith,	l I 5
	beaches	į
1444586:		! 
Wurtsmith sand, beaches, 0 to 3 percent slopes	- Wurtsmith,   beaches	90   
	Grayling,   beaches	5
	i	 
	Meehan, beaches	5 
1444587: Grayling sand, beaches, 2 to 12 percent slopes	 - Grayling,	l I 95
oraying sand, beaches, 2 to 12 percent slopes	beaches	. 33 !
	  Wurtsmith,	l   5
	beaches	 
1529830: Meehan sand, beaches, 0 to 2 percent slopes	 - Meehan, beaches	l I 90
meenan sand, beaches, 5 to 2 percent stopes	1	I
	Newson, beaches	5 
	Wurtsmith,   beaches	5 
1700372:		İ
Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes	- Loxley	40
	  Beseman	I I 30
	  Dawson	l I 28
	    Uskabwanka	   2
		2
1700373: Rifle peat, 0 to 1 percent slopes	 - Rifle	   90
	  Dawson	l I 5
	  Loxley	   5
	Loxiey	
1700374: Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes	 - Allendale	   35
	  Wakeley	   30
	  Kinross	   20
	    Flink	     5
	1	İ
	Sedgwick 	5 
	Tawas	J 5

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Table 1.-Soil Legend-Continued

Map unit symbol and map unit name	   Components in   map unit	Percent   of   map unit
1702605: Menominee loamy sand, 15 to 30 percent slopes	    Menominee	     85
	  Ashwabay	1 10
	  Morganlake 	   5 
1702606: Deerton-Brownstone complex, 0 to 6 percent slopes, very stony	  - Deerton	   50
	  Brownstone	1 40
	  Redrim	l   5
	  Zeba	] 3
	  Abbaye	1 2
1702607: Deerton-Brownstone complex, 6 to 15 percent slopes, very stony	   - Deerton	     50
	Brownstone	1 40
	  Redrim	   5
	  Abbaye	l   3
	  Zeba	1 2
1702608: Abbaye loamy sand, 6 to 15 percent slopes	  -  Abbaye	90
	  Deerton	l   5
	  Zeba	   5
1711685: Cublake-Keweenaw, stony complex, 0 to 6 percent slopes	    Cublake	     50
	  Keweenaw	] 30
	  Annalake	   10
	  Flink	   5
	  Gogebic	   5

Table 2.-Land Capability Classification

(Land capability classification is a system of grouping soils primarily on the basis of their capability to produce common cultivated crops and pasture plants without deteriorating over a long period of time. Only the soils suitable for cultivation are listed. Capability is given for nonirrigated areas)

Map unit symbol and component name	Land  capability
433292:	 
Lerch	6w
Herbster	l   3w
433296:	! 
Cublake	4s 
Croswell	4s
Ashwabay	   4s
433299:	I 
Cublake	6s
Croswell	l   6s
Ashwabay	   6s
433300:	I I
Kellogg	3s
Allendale	l   3w
Ashwabay	   4s
433301:	! 
Kellogg	4s
Allendale	   3w 
Ashwabay	l   6s
433304:	I 
Sedgwick	] 3w
Munuscong	   6w
433305:	! 
Superior	] 3e
Sedgwick	l   3w
433309:	! 
Superior	4e
Sedgwick	l   3w
433310:	 
Sultz	7s
Ashwabay	l   7s
	1

Table 2.—Land Capability Classification—Continued

Map unit symbol and component name	Land  capability
433314:	1
Manistee	7s
Kellogg	   7s
Ashwabay	   7s
433326:	1
Rubicon	4s
433379:	i
Allendale	3w
433515:	İ
Lupton	7w
Cathro	7w
Tawas	   7w
433572 :	1
Portwing	1 3e
Herbster	   3w
433573:	1
Cornucopia	4e
433582:	 
Croswell	4s
433599:	
Annalake	2e
433600:	
Annalake	] 3e
433671:	i
Arnheim	7w
433676:	i
Redrim	7s 
433679:	į
Lapoin	3e 
433686:	į .
Zeba	4s 
433729: Sultz	
Sultz	4s 
433739: Moquah	!
moquan	4w 
433802: Udorthents, ravines and escarpments	   7e
	į
452765: Abbaye	   3e
_	i
Lapoin	3e 

Table 2.—Land Capability Classification—Continued

	1
Map unit symbol and component name	Land  capability
1383557:	1
Au Gres	   4w 
1383580: Loxley	   7w
- Beseman	I
Dawson	   7w
1383581:	1
Rifle	7w
1383603:	! 
Cornucopia	7e 
1383658:	i
Deerton	6s 
Brownstone	6s 
1383660:	İ
Deerton	İ
Brownstone	7s 
1383662:	i
Abbaye	4e 
1383665:	i
Allendale	İ
Wakeley	6w
Kinross	   6w
1383960:	i
Flink	3w 
1444357:	! _
Arnheim	7w 
1444367: Udorthents, ravines and escarpments	   7e
·	/e
1444378: Wakefield	   2e
1444379:	1
Wakefield	   3e
1444388:	 
Allendale	3w 
1444402:	i
Tonkey	6w 
1444410: Tula	
тита	2w 

Table 2.—Land Capability Classification—Continued

Map unit symbol and component name	Land capability
1444414:	!
Lupton	7w
Cathro	   7w
Tawas	7w
1444425:	! !
Lerch	6w 
Herbster	3w 
1444426:	i
Portwing	3e 
Herbster	3w
1444427:	I
Cornucopia	4e 
1444428:	! _
Cornucopia	7e 
1444431: Croswell	1
Croswell	4s 
1444432:	1
Gogebic	4s 
1444435: Iosco	I
	3w 
1444457:	! _
Redrim	7s 
1444459: Zeba	!
Zeba	4s 
1444460:	!
Abbaye	I
Lapoin	3e 
1444461:	I .
Abbaye	4s 
Zeba	4s 
1444477:	I
Cublake	4s 
Croswell	4s 
Ashwabay	4s 
1444478:	i
Cublake	6s
Croswell	   6s
Ashwabay	   6s
	I

Table 2.—Land Capability Classification—Continued

Map unit symbol and component name	   Land  capability
1444479: Morganlake	     3s 
1444480: Morganlake	'     3e 
1444481: Kellogg	   3s
Allendale	   3w 
Ashwabay	4s 
1444482: Kellogg	   4s 
Allendale	İ
Ashwabay	6s 
1444486: Sedgwick	   3w 
Munuscong	6w 
1444487: Superior	   3e
Sedgwick	   3w
1444488: Superior	     4e
Sedgwick	l I 3w
1444489: Sultz	     7s
Ashwabay	   7s
Rubicon	   7s 
1444492: Manistee	'     7s
Kellogg	l   7s
Ashwabay	ı   7s !
1444506: Keweenaw	     3s
Rubicon	   4s 
1444507: Keweenaw	     4s
Rubicon	   6s 
1444585: Meehan, beaches	 

Table 2.—Land Capability Classification—Continued

Map unit symbol and component name	   Land  capability
1444586: Wurtsmith, beaches	     4s
1444587: Grayling, beaches	     6s
1529830: Meehan, beaches	 
1700372: Loxley	     7w
Beseman	   7w
Dawson	   7w
1700373: Rifle	     7w
1700374: Allendale	     3w
Wakeley	l 6w
Kinross	   6w
1702605: Menominee	     6s
1702606: Deerton	     6s
Brownstone	   6s
1702607: Deerton	     7s
Brownstone	   7s
1702608: Abbaye	     4e
1711685: Cublake	     4s
Keweenaw	   3s 

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

### Table 3.-Prime and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland. If a soil is prime or important farmland only under certain conditions, the conditions are indicated in the column "Farmland classification")

Map uni	· •	   Farmland classification 
433305		  Farmland of statewide importance
433572 433599	Portwing-Herbster complex, 0 to 6 percent slopes  Annalake fine sandy loam, lake terrace, 2 to 6 percent   slopes	Farmland of statewide importance  All areas are prime farmland
433600	Annalake fine sandy loam, lake terrace, 6 to 15 percent   slopes	Farmland of statewide importance
1444378	Wakefield fine sandy loam, 1 to 6 percent slopes, stony	All areas are prime farmland
1444402	Tonkey sandy loam, 0 to 2 percent slopes	Prime farmland if drained
1444410	Tula fine sandy loam, 1 to 6 percent slopes, stony	Prime farmland if drained
1444426	Portwing-Herbster complex, 0 to 6 percent slopes	Farmland of statewide importance
1444432	Gogebic fine sandy loam, 1 to 6 percent slopes, very stony	/ All areas are prime farmland
1444487	Superior-Sedgwick complex, 0 to 6 percent slopes	Farmland of statewide importance

Table 4.-Hydric Soils

(This report lists only those map unit components that are rated as hydric. Definitions of hydric criteria codes are included at the end of the report)

	l	1	l I	Hydric soils criteria			
Map unit symbol and	Component	Percent	•	Hydric	Meets		
map unit name	l	of map		criteria	saturation	_	
	<u> </u>	unit	1	code	criteria	criteria	criteria
433292:	! 				i	! 	
Lerch-Herbster complex, 0 to 3 percent slopes	Lerch 	50   50	lake plains,     till plains	2B3, 3	Yes	No	Yes
	  Munuscong 	   5 	ground moraines,    lake plains	2B3, 3	Yes	No	Yes
	  Pickford 	   5 	  depressions,     drainageways	2В3, 3	Yes	No     No	Yes
	  Shag 	   5 	depressions,   drainageways	3, 2B3	Yes	No     No	Yes
433300: Kellogg-Allendale- Ashwabay complex, 2 to 6 percent slopes	  Wakeley 	   5 	drainageways,     depressions	3, 2B3	   Yes 	   No	Yes
433301: Kellogg-Allendale- Ashwabay complex, 6 to 15 percent slopes	    Wakeley 	   3 	drainageways,     depressions	2B3, 3	   Yes 	   No   	Yes
complex, 0 to 6	    Munuscong	     30	  lake plains,     ground moraines	3, 2B3	   Yes	 	Yes
percent slopes	  Pickford 	3	depressions,   drainageways	3, 2B3	Yes	No	Yes
433305: Superior-Sedgwick complex, 0 to 6 percent slopes	    Munuscong   	   3 	drainageways,   depressions	3, 2B3	   Yes 		Yes
433309: Superior-Sedgwick complex, 6 to 15 percent slopes	  Lerch 	   2 	drainageways,   depressions	3, 2B3	   Yes 	   No     No	Yes
433379: Allendale loamy fine sand, 0 to 3 percent slopes	    Wakeley   	     5 	  -  depressions,  -  drainageways  - 	3, 2B3	   Yes 	 	Yes

Table 4.-Hydric Soils-Continued

Man unit combal and	l Commercial	  Domestic	l Inndf	<del></del>	ic soils cr		l Masts
Map unit symbol and	Component	Percent		Hydric	Meets	Meets	
map unit name	!	of map	!	criteria	saturation	_	
	<u> </u>	unit	<u> </u>	code	criteria	criteria	criteria
433515:	1	1	] 		l I	! !	 
Lupton, Cathro, and	  Lupton	I 40	  depressions on	3, 1	l No	l No	ı I Yes
Tawas soils, 0 to 1	I	1 40	disintegration	, 3, 1	1	1	l 163
percent slopes	i	i	moraines		i	i	I
policino clopec	i	i			i	i I	i İ
	Cathro	30	depressions on	1, 3	No	No	Yes
	1	1	disintegration		I	I	I
	1	1	moraines		1	I	l
	1	1			I	I	I
	Tawas	25	depressions on	3, 1	l No	l No	Yes
	!	!	disintegration		!	!	! :
		!	moraines		1	!	l I
	  Seelyeville	I I 5	  depressions on	3, 1	l No	I I No	l   Yes
	laceracine	•	outwash	J, 1	I NO	l NO	l 162
	i	i	plains,		i	i	i i
	i	i	depressions on		i	i	I
	i	İ	lake plains		į	İ	İ
	1	1	I		I	I	I
433572:	1	1	l I		I	I	l
Portwing-Herbster	Lerch		depressions on	2B3, 3	Yes	l No	Yes
complex, 0 to 6	!	!	till plains,		!	!	<u> </u>
percent slopes	!	!	drainageways		!	!	! :
	1	!	on till plains		 	! !	! !
433671:	1	:	! !		I I	! !	! 
Arnheim mucky silt	Arnheim	85	  flood plains	4, 3, 2B3	Yes	   Yes	ı   Yes
loam, 0 to 1 percent	1	i		-, -,	i	i	i
slopes, frequently	i	i	j i		į	İ	İ
flooded	1	1	1		I	I	I
	1	I			I	I	l
433739:	1	1			I	I	I
Moquah fine sandy	Arnheim	1 5	flood plains	3, 4, 2B3	Yes	Yes	Yes
loam, 0 to 3 percent	!	!			!	!	! :
slopes, frequently	1	!				!	<u> </u>
flooded	1	!	] 		 	!	 
433771:	1	1	! !		 	! !	! !
Beaches, 2 to 12	Psammaquents	1 3	depressions	2B2, 3	Yes	l No	ı   Yes
percent slopes		i	dop=000=00	,		i -:-	, <u>-</u>
-	i	i	j i		į	İ	İ
1383557:	1	I	I		I	I	I
Au Gres loamy sand, 0	Kinross	5	depressions,	2B3, 3	Yes	l No	Yes
to 3 percent slopes	1	1	drainageways		1	I	I
	1	1	!		!	!	!
1383580:		1			ļ	!	! 
Loxley, Beseman, and	Loxley		depressions on	3, 1	l No	No	Yes
Dawson soils, 0 to 1 percent slopes	1		disintegration     moraines		 	! !	! !
percent slopes	i	;	MOTATHES		 	<u> </u>	! 
	Beseman	i 30	depressions on	3, 1	l No	,   No	Yes
	i		disintegration		i	i	İ
	1		moraines		I	I	l
	1	1	1		I	I	l
	Dawson	28	depressions on	3, 1	l No	l No	Yes
	1		disintegration		I	I	I
	1	!	moraines		<u> </u>	!	l
	1	1	I		I	I	I
	1 ** - 1 - 1		I de la company to the company of th				
	Uskabwanka		depressions on	1	No	l No	l No
	Uskabwanka 		depressions on     disintegration     moraines		No 	No 	No 

Table 4.-Hydric Soils-Continued

	T	ī	I	Hydr	ic soils cr	iteria	
Map unit symbol and	Component	Percent	Landform	Hydric	Meets	Meets	Meets
map unit name	1	of map	l I	criteria	saturation	flooding	ponding
	<u> </u>	unit	<u> </u>	code	criteria	criteria	criteria
1383581:	1		] ]		1	 	 
Rifle peat, 0 to 1	Rifle	i 90	depressions on	3, 1	l No	l No	l Yes
percent slopes	i		moraines,	, -, - I	i	i	i
F	i	1	depressions on	1	i	i	I
	i		outwash	İ	i	i	I
	i	i	plains,		i	i	İ
	İ	i	depressions on	]	İ	İ	İ
	1	1	lake plains		1	l .	<u> </u>
	  Dawson	I I 5	  depressions on	   1,3	   No	l   No	   Yes
	1	1	lake plains,	1	I	I	I
	1	1	depressions on		1	I	I
	1	1	moraines, bogs		1	I	l
	1	1	on lake		1	I	l
	1	1	plains, bogs		I	I	l
	1		on moraines,		1	I	l
	1		depressions on		1	1	l
	!		outwash		1	1	l
	!		plains, bogs		1	!	! :
	!		on outwash		!	!	! :
	I I	1	plains   		1	! !	 
	Loxley	j 5	depressions on	3, 1	l No	No	Yes
	į		lake plains,	Ì	İ	İ	İ
	İ	İ	depressions on	]	İ	ĺ	ĺ
	1	1	moraines, bogs		1	I	l
	1	1	on lake		1	I	l
	1	1	plains, bogs		1	I	l
	1		on moraines,		1	I	l
	1		depressions on		I	I	l
	!	:	outwash		!	!	<u> </u>
	!	!	plains, bogs		1	!	! :
	 		on outwash     plains		 	 	 
1383665:	1	1	-  -		1	l .	<u> </u>
Allendale-Wakeley-	  Wakeley	30	  outwash plains,	   2B3,3	Yes	l No	ı   Yes
Kinross complex, 0 to		1	lake plains	, -	1	İ	
6 percent slopes	I	1	i -	l	I	I	l
	Kinross	20	stream	3, 2B3	Yes	l No	Yes
	1		terraces,	1	1	I	l
	1		outwash	1	1	I	l
	1		plains, lake		1	I	l
	 	1	plains   	]	1	 	 
	Tawas	5	  depressions	1, 3	No	l No	   Yes
1383960:	 	I	 		I I	 	 
Flink sand, 0 to 3	  Kinross	I I 5	  drainageways,	   3,2B3	   Yes	I I No	ı I Yes
percent slopes		i	depressions	, <i>5, <u>2</u>25</i>	, 163	1	, 163
F 3-20-12 2-0PC2	i	i			i	i i	I
1444357:	1	1	l i	l _	I	I	l
Arnheim mucky silt	Arnheim	85	flood plains	3, 2B3, 4	Yes	Yes	Yes
loam, 0 to 1 percent	!	!	[		1	!	  -
slopes, frequently	!	I	[		1	!	l ·
flooded	1	1	[		1	Į .	l ·
	I	I	ı	I	I	I	I

Table 4.-Hydric Soils-Continued

	1	1		Hydric soils criteria				
Map unit symbol and	Component	Percent		Hydric	,	Meets		
map unit name	1	of map		criteria	saturation	_		
	<u> </u>	unit	<u> </u>	code	criteria	criteria	criteria	
1444359: Beaches, 2 to 12 percent slopes	    Psammaquents 	   3 	    depressions 	     3,2B2 	   Yes 	     No 	     Yes 	
1444388: Allendale loamy fine sand, 0 to 3 percent slopes	    Wakeley   	     5 	    depressions,   drainageways 	     3,2B3   	   Yes 	     No 	     Yes 	
1444402: Tonkey sandy loam, 0 to 2 percent slopes	  Tonkey                 	 		   3, 2B3               	Yes	   No                 	   Yes               	
	  Shag 	4	  drainageways,   depressions	   2B3,3 	   Yes 	   No 	   Yes 	
1444410: Tula fine sandy loam, 1 to 6 percent slopes, stony	    Pleine   	   5 	    drainageways,   depressions 	   2B3, 3 	   Yes 	   No 	     Yes 	
1444414: Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes	  Lupton 	   40 	  depressions on   disintegration   moraines	     1,3 	   No 	     No   	     Yes   	
	  Cathro   		  depressions on   disintegration   moraines	   1,3 	No   	   No   	   Yes   	
	  Tawas   		  depressions on   disintegration   moraines	   1,3 	   No 	   No 	   Yes 	
	  Seelyeville       	•	  depressions on   outwash   plains,   depressions on   lake plains	   1,3       	   No       	   No         	   Yes       	

Table 4.-Hydric Soils-Continued

					ic soils cr		
Map unit symbol and	Component	Percent		Hydric	,	Meets	
map unit name	!	of map		criteria	saturation		
	<u> </u>	unit	<u>                                     </u>	code	criteria	criteria	criteria
1444425:	 	1	 		1	! !	
	  Lerch	i 50	  lake plains,	2B3, 3	Yes	l No	Yes
complex, 0 to 3	1	1	till plains	223, 3	1	1 10	1
percent slopes	' 	<u> </u>	l ciii piains		i		
percent bropes	  Munuscong	, I 5	ground moraines,	3, 2B3	   Yes	l No	Yes
		i	lake plains	-,	i	i	
	İ	i	i i		i	i i	
	Pickford	5	depressions,	2B3, 3	Yes	l No	Yes
	l	1	drainageways		1	I 1	
	l	1			I	<b>I</b> 1	
	Shag	5	depressions,	2B3, 3	Yes	No	Yes
	l	1	drainageways		1	<b>I</b> 1	
	I		l l		1	<b>I</b> 1	
L444426:	!		. !		!	<u> </u>	
	Lerch	5	depressions on	2B3, 3	Yes	No	Yes
complex, 0 to 6	!	!	till plains,		!	!	
percent slopes	!	!	drainageways		ļ	!	
	  -	!	on till plains				ļ
1444435:	  -	!			1		1
Iosco loamy sand, 0 to	l Tonkov	I I 5	۱  drainageways,	3, 2B3	   Yes	l No I	Yes
4 percent slopes	i tolikey	1 3	depressions	3, 263	l ies	I NO I	i
4 percent slopes	! 	i	depiessions		i i	' '	
1444481:	' 	i	' ' 		i	<u>'</u>	
	  Wakeley	, I 5	drainageways,	3, 2B3	   Yes	l No	Yes
Ashwabay complex, 2 to	· -	i	depressions	0,0	1	1	
6 percent slopes	i i	i			i	i i	i
· Principle	i i	i	i i		i	i i	i
444482:	İ	i	i i		i	i i	
Kellogg-Allendale-	Wakeley	3	drainageways,	3, 2B3	Yes	l No	Yes
Ashwabay complex, 0 to	Ī	İ	depressions		İ	İ	
15 percent slopes	I	1	I - I		I	I	1
	I	1	Ι Ι		1	<b>I</b> 1	l
1444486:	l	1			I	<b>I</b> 1	
Sedgwick-Munuscong	Munuscong	30	lake plains,	3, 2B3	Yes	No	Yes
complex, 0 to 6	l		ground moraines		1	I 1	
percent slopes	I		l l		1	<b>I</b> 1	
	Pickford	] 3	depressions,	3, 2B3	Yes	No	Yes
	!	!	drainageways		ļ	!	
1444407	<u> </u>	!			!	!	
1444487:	134	1		2 052			
Superior-Sedgwick	Munuscong	3	drainageways,	3, 2B3	Yes	No	Yes
complex, 0 to 6	! !	!	depressions		1	!	
percent slopes	l I	1			1		] ]
1444488:	! 	1			i I	· !	† 
	  Lerch	1 2	ا  drainageways,	2B3, 3	   Yes	l No I	Yes
complex, 6 to 15	1	<u> </u>	depressions	223, 3	1	1 10	1
percent slopes	i I	i			i	i	· ]
Possess saspes	i i	i	i i		i	i i	i
1444585:	I	i	'		i		
	Newson,	5	depressions	2B2	Yes	No	No
0 to 2 percent slopes	•	i	i i		i	i i	
	I	1	i i		I	ı	
529830:	I	1	i		I	ı	
Mehan sand, beaches,	Newson,	5	depressions	2B2	Yes	No i	
0 to 2 percent slopes	•	1	ı İ		1	ı	

Table 4.-Hydric Soils-Continued

	1	I			ic soils cr		
Map unit symbol and	Component	Percent		Hydric	Meets		
map unit name	!	of map		criteria	saturation		
	<del>- </del>	unit	<u> </u>	code	criteria	criteria	criteria
1700372: Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes	  Loxley   	İ	    depressions on   disintegration   moraines	     1,3 	   No 	 	   Yes 
	  Beseman   	1	  depressions on   disintegration   moraines	   1,3 	   No 	No     No   	   Yes 
	  Dawson   		  depressions on   disintegration   moraines	   3,1 	   No 	No     No   	   Yes 
	  Uskabwanka   		  depressions on   disintegration   moraines	   1 	   No   	No     No   	   No 
1700373: Rifle peat, 0 to 1 percent slopes	  Rifle           	 	  depressions on   moraines,   depressions on   outwash   plains,   depressions on   lake plains	   3, 1         	   No         	   No           	Yes
	  Dawson                   		depressions on   lake plains,   depressions on   moraines, bogs   on lake   plains, bogs   on moraines,   depressions on   outwash   plains, bogs   on outwash   plains	 	No     No	No	Yes
	  Loxley                 		depressions on   lake plains,   depressions on   moraines, bogs   on lake   plains, bogs   on moraines,   depressions on   outwash   plains, bogs   on outwash   plains	 	No     No	No	Yes

Table 4.-Hydric Soils-Continued

	1	1	1	Hyd:	ric soils cr	iteria	
Map unit symbol and	Component	Percent	:  Landform	Hydric	Meets	Meets	Meets
map unit name	1	of map	)	criteria	saturation	flooding	ponding
	1	unit	1	l code	criteria	criteria	criteria
	I	ı	I	ı	ı	ı	I
1700374:	1	1	I	I	1	I	I
Allendale-Wakeley-	Wakeley	30	outwash plains,	3, 2B3	Yes	No	Yes
Kinross complex, 0 to	1	1	lake plains	I	1	I	I
6 percent slopes	1	1	1	I	1	I	I
	Kinross	20	stream	3, 2B3	Yes	No	Yes
	1	1	terraces,	I	1	I	I
	1	1	outwash	I	1	I	I
	1	I	plains, lake	I	1	I	I
	1	I	plains	I	1	I	I
	1	I	1	I	1	I	I
	Tawas	5	depressions	3,1	l No	No	Yes
	1	1	1	I	1	1	I

#### Explanation of hydric criteria codes

- All Histels (except for Folistels), and Histosols (except for Folists), which are, by definition, saturated.
- 2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
  - A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
  - B. are poorly drained or very poorly drained and have either:
    - 1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
    - 2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
    - 3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
- Soils that are frequently ponded for periods of long or very long duration during the growing season.
- Soils that are frequently flooded for periods of long or very long duration during the growing season.

Table 5.-Landform and Parent Material

(Only major components are displayed in this report. Miscellaneous nonsoil components may not be included. Component percents may not add up to 100. MAP is the mean annual precipitation)

	Percent    of map    unit		Elevation     	MAP	Landform   	Parent material
	Pct	Pct	l <u>Ft</u>	In	1	  -
433292: Lerch	50     50                 	0-2	   600-1099         	28-33	till plain     	Clayey till and/or   clayey lacustrine   deposits modified   by wave action   over loamy and/or   sandy stratified   lacustrine   depositss
Herbster	35     35             	0-3	   600-1099	28-33	1	  Clayey till and   underlying loamy   and sandy   stratified   lacustrine deposits 
433296: Cublake	35     35               	0-6	   600-1099	28-33	 	  Sandy outwash   underlain by   stratified silty,   loamy, and sandy   glaciofuvial   deposits
Ashwabay	20     20         	0-6	850-1152   	28-33	lake plain,   and outwash   plain	Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
Croswell	20     20   	0-6	   600-1099	27-34	Lake plain,   lake terrace,   outwash plain,   and stream   terrace	
433299: Cublake		6-15	   600-1099	28-33	 	  Sandy outwash   underlain by   stratified silty,   loamy, and sandy   glaciofuvial   deposits
Ashwabay	20     20         	6-15	   850-1152       	28-33	lake plain,   and outwash   plain	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
Croswell	20     20   	6-12	   600-1099	27-34	Lake plain,   lake terrace,   outwash plain,   and stream   terrace	

Table 5.-Landform and Parent Material-Continued

Map unit symbol	  Percent	Slope	   Elevation	MAP	   Landform	 
	of map    unit	_	 	PARE		rarent   material 
	Pct	Pct	Ft	In	i i	Ī
433300: Kellogg	—     35     3   	2-6		 27-32	 	  Sandy lacustrine or   outwash sediments   and underlying   clayey lacustrine   deposits
Allendale	25     25         	2-6	   600-1699       	27-34	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits 
Ashwabay	20	2-6	   850-1152         	28-33	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits 
433301: Kellogg	40     40         	6-15	600-1401     600-1401   	27-32	i -	  Sandy lacustrine or   outwash sediments   and underlying   clayey lacustrine   deposits
Allendale	25       1       	6-12	600-1699   	27-34	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits 
Ashwabay	20	6-15	850-1152     850-1152   	28-32	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
433304: Sedgwick	   50   	0-6	   600-1001   	28-33	· •	  Loamy alluvium and   underlying clayey   till
Munuscong	30     30         	0-2	   600-1099	28-33		  Loamy glaciofluvial   deposits over   calcareous clayey   materials
433305: Superior	   50       	2-6	   600-1099   	28-33	1	  -  Loamy water-laid   deposits and   underlying clayey   lacustrine deposits
Sedgwick		0-3	   600-1001       	28-33	1	  Loamy alluvium and   underlying clayey   till 

Table 5.-Landform and Parent Material-Continued

	  Percent    of map    unit	_	   Elevation 	   MAP 	Landform   	Parent   material 
	Pct	Pct	<u>Ft</u>	In In	I	I
433309: Superior		6-15	600-1099 	   28-33     	  -  Lake plain  -   	  -  Loamy water-laid   deposits and   underlying clayey   lacustrine deposits
Sedgwick	   30       	0-15	   600-1001 	   28-33   	  Till plain     	  Loamy alluvium and   underlying clayey   till
433310: Sultz	35     35   	15-45	699-1952	   28-33       	lake terrace,   outwash plain,	  Sandy outwash   underlain by   stratified loamy   or loamy and sandy   alluvium or   lacustrine deposits
Ashwabay	25     25         	15-30	850-1152 	   28-32     	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
Rubicon		15-45	   600-1401 	   27-34 	  Outwash plain 	  Sandy deposits 
433314: Manistee	40     40         	15-45	600-1401	   27-34       	  Lake plain         	  Sandy lacustrine   and outwash   sediments   underlain by   clayey lacustrine   deposits
Kellogg	   30       	15-30	600-1401	   27-32     	  Lake terrace       	Sandy lacustrine or   outwash sediments   and underlying   clayey lacustrine   deposits
Ashwabay	20	15-45	850-1152   	   28-33       	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
433326: Rubicon		0-6	     600-1801	     27-34 	    Outwash plain 	    Outwash sands 
433379: Allendale		0-3	600-1699	   27-34       	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits 

Table 5.-Landform and Parent Material-Continued

	1 1					
Map unit symbol and soil name	  Percent    of map    unit	-	   Elevation   	   MAP 	Landform   	Parent   material
	Pct	Pct	   Ft	l In	<u>'</u>	<u>'</u> I
433515: Lupton		0-1	       669-1601   	     27-34   	•	
Cathro	30     30         	0-1	   600-1601       	   27-43     	disintegration   moraine	  Herbaceous organic   material 16 to 51   inches thick   underlain by loamy   deposits
Tawas	25     25         	0-1	   600-1601       	   27-35     	disintegration	  Herbaceous organic   material 16 to 51   inches thick over   sandy deposits 
433572: Portwing		2-6	   600-1099       	   28-33       	i I	  Clayey till over   underlying   stratified loamy   and sandy   lacustrine deposits
Herbster	30   	0-3	699-1099 	28-33         	I I	  Clayey till and   underlying loamy   and sandy   stratified   lacustrine deposits 
433573: Cornucopia	80     80   	6-15	   600-1099         	   28-33         	1	  Clayey till and   underlying   stratified loamy   and sandy   lacustrine deposits 
433582: Croswell	82     82   	0-6	   600-1470       	   27-34       	  Lake plain,   lake terrace,   outwash plain,   and stream   terrace	
433599: Annalake		2-6	   600-1949         	   28-33         	 	  Stratified sandy   and loamy   glaciofluvial and   glaciolacustrine   deposits 
433600: Annalake		6-15	   600-1949       	   28-33         	I I	  Stratified sandy   and loamy   glaciofluvial and   glaciolacustrine   deposits 

Table 5.-Landform and Parent Material-Continued

= =	  Percent    of map    unit	_	   Elevation   	MAP	Landform 	Parent   material
	Pct	Pct	l Ft	   In	<u> </u>	<u> </u> 
	; — ;		<u> </u>	_	İ	I
433671: Arnheim	   85	0-1	   600-1099	28-35	  Flood plain	  Loamy alluvium 
433676: Redrim	   85     85   	0-6	   600-1001     	28-33 	I	  Sandy-skeletal beach   deposits or   residuum from   sandstone, or both
433679: Lapoin	   85     85   	0-6	   600-1001     	28-33	I	  Loamy alluvium and   clayey till and   underlying loamy   till
433686: Zeba	   90   	0-6	   600-1099   	26-33 		  Loamy glacial drift   underlain by   sandstone bedrock
433729: Sultz		0-6	   699-1952         	28-33	 	  Sandy outwash   underlain by   stratified loamy   or loamy and sandy   alluvium or   lacustrine deposits
433739: Moquah	         85	0-3	 	28-35	    Flood plain	    Loamy alluvium
433771: Beaches	       97	2-12			 	 
433802: Udorthents, ravines and escarpments		35-60	 		 	 
452739. Water	 		 		 	 
452765: Abbaye	   55	0-6	   600-1099   	26-33		  Till underlain by   sandstone bedrock
Lapoin	40     40         	0-6	   600-1001         	28-33	1	  Loamy alluvium and   clayey till and   underlying loamy   till 
1383557: Au Gres		0-3	   600-1801   	   27-34 	  Outwash plain 	  Sandy outwash 
1383580: Loxley	40     40   	0-1	   600-1401     	   27-34 	disintegration	  Herbaceous organic   material more than   51 inches thick 

Table 5.-Landform and Parent Material-Continued

Map unit symbol and soil name	Percent    of map    unit	_	   Elevation     	MAP	Landform   	Parent   material 
	Pct	Pct	Ft	In	Ī	I
1383580: Beseman		0-1	 	24-45	disintegration	  -  Herbaceous organic   material 16 to 51   inches thick over   loamy till
Dawson	28     28               	0-1	   600-1401	27-35	disintegration   moraine 	  Sphagnum moss and   herbaceous organic   material 16 to 51   inches thick over   sandy or sandy and   gravelly deposits
1383581: Rifle	90     90         	0-1	   600-1099           	28-33		Ī
1383603: Cornucopia		15-45	   600-1099       	28-33	1	  Clayey till and   underlying   stratified loamy   and sandy   lacustrine deposits
1383658: Deerton	   50       51   	0-6	   600-1001	26-33	İ	  Sandy outwash beach   deposits or sandy   residuum from   sandstone
Brownstone	40   	0-6	   600-1001           	28-33	1	  Sandy-skeletal beach   deposits or   residuum from   sandstone, or both 
1383660: Deerton		6-15		26-33	İ	  Sandy outwash beach   deposits or sandy   residuum from   sandstone
Brownstone	40   	6-15	   600-1001   	28-33	I	  Sandy-skeletal beach   deposits or   residuum from   sandstone, or both 
1383662: Abbaye	90     1	6-15	600-1099   	26-33	    Hill 	    Till underlain by   sandstone bedrock 
1383665: Allendale	   35       	0-6	   600-1699	27-34	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits 

Table 5.-Landform and Parent Material-Continued

	  Percent    of map    unit	_	   Elevation   	   MAP 	Landform   	   Parent   material 
	Pct	Pct	l <u>Ft</u>	In	<u> </u>	I
1383665: Wakeley		0-2	     600-1099       	28-32	outwash plain   	  Sandy outwash and   lacustrine   material underlain   by clayey   lacustrine deposits
Kinross	20     20         	0-2	   600-1099       	   27-34   	  Lake plain,   outwash plain,   and stream   terrace	  Glaciofluvial   material     
1383960: Flink	75     75           	0-3	   600-1900         	28-33	lake terrace,   outwash plain,   and outwash   terrace	  Sandy outwash   underlain by   stratified silty,   loamy, and sandy   glaciofluvial   deposits
1444357: Arnheim	         85	0-1	     600-1099	28-35	  Flood plain	  -  Loamy alluvium
1444359: Beaches	       97	2-12	 		!	 
1444367: Udorthents, ravines and escarpments		35-60	 		 	 
1444378: Wakefield		1-6	     1299-1601     	26-33   	i	  Modified loamy   eolian deposits   and underlying   loamy till
1444379: Wakefield		6-18	   1299-1601     	26-33   	1	  Modified loamy   eolian deposits   and underlying   loamy till
1444388: Allendale	   80       1	0-3	   600-1699     		lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits
1444402: Tonkey	   90     1   	0-2	     600-1099     	   28-30   	lake plain and   drainageway on	
1444410: Tula		0-4	     1299-1598     	30-34 	1	  Modified loamy   eolian material   and underlying   loamy till

Table 5.-Landform and Parent Material-Continued

	  Percent    of map    unit	_	   Elevation   	MAP	Landform   	   Parent   material 
	Pct	Pct	Ft Ft	In	I	I
1444414: Lupton		0-1	     669-1601   	27-34	•	
Cathro	30     30         	0-1	   600-1601     	27-43	disintegration   moraine 	  Herbaceous organic   material 16 to 51   inches thick   underlain by loamy   deposits
Tawas	25     25         	0-1	   600-1601     	27-35	disintegration   moraine	  Herbaceous organic   material 16 to 51   inches thick over   sandy deposits
1444425: Lerch	50     50               	0-2	   600-1099             	28-33	till plain           	Clayey till and/or   clayey lacustrine   deposits modified   by wave action   over loamy and/or   sandy stratified   lacustrine   depositss
Herbster	35     35         	0-3	   600-1099       	28-33	I I	  Clayey till and   underlying loamy   and sandy   stratified   lacustrine deposits 
1444426: Portwing	   50         	2-6	   600-1099     	28-33	 	  Clayey till over   underlying   stratified loamy   and sandy   lacustrine deposits
Herbster	30     30             	0-3	   699-1099         	28-33	I I	  Clayey till and   underlying loamy   and sandy   stratified   lacustrine deposits 
1444427: Cornucopia		6-15	   600-1099       	28-33	I I	  Clayey till and   underlying   stratified loamy   and sandy   lacustrine deposits 
1444428: Cornucopia	   80             	15-45	   600-1099       	28-33	 	  Clayey till and   underlying   stratified loamy   and sandy   lacustrine deposits

Table 5.-Landform and Parent Material-Continued

	  Percent    of map    unit	_	   Elevation   	   MAP 	Landform   	Parent   material 
	Pct	Pct	<u>Ft</u>	<u>In</u>	1	I
1444431: Croswell		0-6	     600-1470     	   27-34   	  Lake plain,  lake terrace,  outwash plain,  and stream  terrace	    Sandy glacial drift       
1444432: Gogebic	85     85   	1-6	   1299-1598         	30-34   	1	  Modified loamy   eolian deposits   and underlying   loamy till
1444435: Iosco	85     81   	0-4	   600-1099     	28-32 	lake plain,   and outwash	  Sandy lacustrine or   outwash deposits   overlying loamy   lacustrine or till   deposits
1444457: Redrim	   85     85   	0-6	600-1001   600-1001	28-33   		  Sandy-skeletal beach   deposits or   residuum from   sandstone, or both
1444459: Zeba	   90         	0-6	   600-1099   	26-33 		  -  Loamy glacial drift   underlain by   sandstone bedrock 
1444460: Abbaye	   55   	0-6	   600-1099 	26-33		  Till underlain by   sandstone bedrock
Lapoin	40     40         	0-6	   600-1001       	28-33   	1	  Loamy alluvium and   clayey till and   underlying loamy   till 
1444461: Abbaye	   55   	0-6	   600-1099 	   26-33 		  Till underlain by   sandstone bedrock
Zeba	40     40   	0-6	   600-1099     	   26-33   	  Hill     	  Loamy glacial drift   underlain by   sandstone bedrock 
1444477: Cublake		0-6	   600-1099         	28-33	 	  Sandy outwash   underlain by   stratified silty,   loamy, and sandy   glaciofuvial   deposits
Ashwabay	20	0-6	   850-1152         	28-33   	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits 

Table 5.-Landform and Parent Material-Continued

Map unit symbol and soil name	  Percent    of map    unit	-	   Elevation   	MAP	Landform   	Parent   material 
	Pct	Pct	Ft	In	Ī	I
1444477: Croswell		0-6	   600-1099	27-34	  Lake plain,  lake terrace,  outwash plain,  and stream  terrace	    Sandy glacial drift       
1444478: Cublake	35     35         	6-15	600-1099     600-1099         	28-33	 	  Sandy outwash   underlain by   stratified silty,   loamy, and sandy   glaciofuvial   deposits
Ashwabay	20     20         	6-15	   850-1152       	28-33	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposit:
Croswell	20   	6-12	600-1099               	27-34	Lake plain,   lake terrace,   outwash plain,   and stream   terrace	  Sandy glacial drift         
1444479: Morganlake	   85   	0-6	   699-1099   	28-33		  Sandy outwash and   underlying loamy   till
1444480: Morganlake		6-15	   699-1099	28-33		    Sandy outwash and   underlying loamy   till
1444481: Kellogg		2-6	   600-1401       	27-32		  Sandy lacustrine or   outwash sediments   and underlying   clayey lacustrine   deposits
Allendale	25     25         	2-6	   600-1699       	27-34	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits 
Ashwabay	20     20         	2-6	850-1152       850-1152   	28-33	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposit:

Table 5.-Landform and Parent Material-Continued

Map unit symbol and soil name	Percent   Of map	-	   Elevation   	MAP	Landform	Parent material
	unit     Pct	Pct	l Ft	l In	<u></u>	<u> </u> 
	<u>====</u>		<u> </u>	<u> </u>	1	! 
1444482: Kellogg	40     40   	6-15	   600-1401     	27-32	i I	  Sandy lacustrine or   outwash sediments   and underlying   clayey lacustrine   deposits
Allendale	25     25       	6-12	600-1699   	27-34   	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits
Ashwabay	20	6-15	   850-1152         	28-32   	lake plain,   and outwash	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
1444486: Sedgwick	   50   	0-6	   600-1001   	28-33 	· -	  Loamy alluvium and   underlying clayey   till
Munuscong	30     30   	0-2	   600-1099       	28-33 	and lake plain	  Loamy glaciofluvial   deposits over   calcareous clayey   materials
1444487: Superior	   50   	2-6	   600-1099   	28-33 	_	  -  Loamy water-laid   deposits and   underlying clayey   lacustrine deposits
Sedgwick		0-3	   600-1001       	   28-33   	i -	  Loamy alluvium and   underlying clayey   till 
1444488: Superior	   50     1   	6-15	   600-1099         	28-33 	I	  Loamy water-laid   deposits and   underlying clayey   lacustrine deposits
Sedgwick	   30       	0-15		   28-33   	_	  Loamy alluvium and   underlying clayey   till
1444489: Sultz	35     35         	15-45	   699-1952       	28-33	lake terrace,   outwash plain,   and outwash	  Sandy outwash   underlain by   stratified loamy   or loamy and sandy   alluvium or   lacustrine deposits

Table 5.-Landform and Parent Material-Continued

	1				· · · · · · · · · · · · · · · · · · ·	
Map unit symbol and soil name	Percent    of map    unit	_	   Elevation 	   MAP 	Landform 	Parent   material
	Pct	Pct	   Ft	l In	<u>'</u>	<u>'</u> 
1444489: Ashwabay	 	15-30	     850-1152     	     28-32     	lake plain,   and outwash   plain	    Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
Rubicon		15-45	   600-1401	   27-34 	  Outwash plain	  Sandy deposits 
1444492: Manistee	40     40   	15-45	   600-1401     	   27-34     	  Lake plain           	  Sandy lacustrine   and outwash   sediments   underlain by   clayey lacustrine   deposits
Kellogg	30     30   	15-30	   600-1401     	   27-32     	Ì	  Sandy lacustrine or   outwash sediments   and underlying   clayey lacustrine   deposits
Ashwabay	20       20   	15-45	   850-1152     	   28-33     	lake plain,	  Sandy outwash or   beach deposits   underlain by   clayey till or   lacustrine deposits
1444506: Keweenaw	     60   	2-6	   	     26-33 	    Disintegration   moraine	    Sandy till 
Rubicon	30     30   	0-6	   600-1801 	   27-34 	  Disintegration   moraine	  Outwash sands   
1444507: Keweenaw	   60   	6-15	 	   26-33 	  Disintegration   moraine	  Sandy till 
Rubicon	30     30	6-15	   600-1801 	   27-34 	  Disintegration   moraine	  Outwash sands 
1444585: Meehan, beaches		0-2	     669-1952 	     25-35 	    Beach ridge 	    Sandy alluvium 
1444586: Wurtsmith, beaches-		0-3	     600-1401 	     24-30 	  Beach ridge and   dune 	  -  Sandy outwash and   lacustrine deposits 
1444587: Grayling, beaches	   95   	2-12	     600-1401 	     27-34 	    Beach ridge 	    Sandy deposits 
1529830: Meehan, beaches	   90   	0-2	   669-1952 	   25-35 	  Beach ridge 	  Sandy alluvium 

Table 5.-Landform and Parent Material-Continued

	  Percent    of map    unit	_	Elevation	MAP	   Landform   	Parent   material 
	Pct	Pct	Ft -	<u> </u>	 	 
1700372: Loxley	   40   	0-1	600-1401	27-34 	disintegration	  Herbaceous organic   material more than   51 inches thick
Beseman	30     30   	0-1	600-1401	24-45   	disintegration   moraine	  Herbaceous organic   material 16 to 51   inches thick over   loamy till
Dawson	28	0-1	600-1401	27-35	disintegration   moraine 	  Sphagnum moss and   herbaceous organic   material 16 to 51   inches thick over   sandy or sandy and   gravelly deposits
1700373: Rifle		0-1	600-1099	28-33	· -	l
1700374: Allendale	35     35   	0-6	600-1699	27-34   	lake plain,   lake terrace,	  Sandy sediments and   underlying clayey   lacustrine or till   deposits 
Wakeley	   30       	0-2	600-1099 	28-32   	outwash plain   	  Sandy outwash and   lacustrine   material underlain   by clayey   lacustrine deposits
Kinross	20     20   	0-2	600-1099 	   27-34 	  Lake plain,   outwash plain,   and stream   terrace	  Glaciofluvial   material   
1702605: Menominee		15-30	600-1099	28-32	ground   moraine, lake	  Sandy glaciofluvial   material over   loamy till or   lacustrine   sediments
1702606: Deerton		0-6	600-1001	26-33 	 	  Sandy outwash beach   deposits or sandy   residuum from   sandstone 

Table 5.-Landform and Parent Material-Continued

Map unit symbol and soil name	  Percent    of map    unit	-	   Elevation   	   MAP 	   Landform 	   Parent   material
	Pct	Pct	<u>Ft</u>	In	I	I
1702606: Brownstone		0-6	     600-1001     	     28-33     	    Hill     	  Sandy-skeletal beach   deposits or   residuum from   sandstone, or both
1702607:	i <u>.</u> i					<u>.</u>
Deerton	50             	6-15	600-1001   	26-33     	Hill 	Sandy outwash beach   deposits or sandy   residuum from   sandstone
Brownstone	40     40   	6-15	   600-1001     	   28-33     	  Hill     	  Sandy-skeletal beach   deposits or   residuum from   sandstone, or both 
1702608:	i i		İ	İ	İ	İ
Abbaye	90   	6-15	600-1099   	26-33   	Hill 	Till underlain by   sandstone bedrock
1711685:	i i		İ	İ	İ	
Cublake	50                 	0-6	600-1099   	28-33           	         	Sandy outwash   underlain by   stratified silty,   loamy, and sandy   glaciofuvial   deposits
Keweenaw		2-6	   600-1949   	   26-33   	  Disintegration   moraine 	  Sandy till   

## Table 6.-Land Management, Part I (Planting)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

	Pct.	•		Suitability fo:		   Soil rutting haz	ard
and soil name	of	·		mechanical plant		<u> </u>	
	map  unit	Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features	•
422000	Į.	<u> </u>	ļ	<u> </u>	ļ	<u> </u>	Ţ
433292:	1 -0	 	!	 	!		!
Lerch	1 50	-			•	Severe	11 00
	!	stickiness; high   plasticity index		Stickiness; high   plasticity index		l row strength	1.00
	:				ı 10.75	I I	1
	i	l ne aness	l	l neemees	0 . <i>1</i> 5	i İ	i
Herbster	I 35	Moderately suited	i i	Moderately suited	i	Severe	i
		Stickiness; high		<del>-</del>		•	11.00
	İ	plasticity index	İ	plasticity index	ĺ	ĺ	İ
	I	l	I	l	I	l	1
433296:	I	I	l	I	I	I	1
Cublake	35	Well suited	I	Well suited	I	Moderate	1
	!	]	!	<u> </u>	!	Low strength	10.50
0	1		!		!		!
Croswell	1 20	Well suited	! !	Well suited	•	Moderate	10.50
	!	I I	 	I I	! !	Low strength	10.50
Ashwabay	20	ı  Well suited	! !	  Well suited		  Moderate	i
	i		i		•	Low strength	10.50
	i	i I	i	i İ	i İ	I	i
433299:	İ		İ		ĺ		İ
Cublake	35	Well suited	I	Moderately suited	I	Moderate	1
	I	I	l	Slope	0.50	Low strength	10.50
	I	I	I	I	I	I	1
Croswell	20	Well suited	I	Moderately suited	•	Moderate	1
	!	<u> </u>	!	Slope	0.50	Low strength	10.50
Ashwabay	1 20	  Well suited	! !	  Moderately quited	!	  Modorato	1
Ashwabay	1 20	Weil Suited	! !	Moderately suited   Slope		Moderate   Low strength	10.50
	i .	! 	! !	l siope	10.30 I	l now screngen	10.50
433300:	i		i		i		i
Kellogg	35	Moderately suited	İ	Moderately suited	İ	Moderate	i
	I	Sandiness	0.50	Sandiness	0.50	Low strength	10.50
	I	I	I	l	I	l	1
Allendale	25	Well suited	l	Well suited	I	Moderate	1
	!	<u> </u>	!	<u> </u>	!	Low strength	10.50
3 abasahasa	1		!		!		1
Ashwabay	1 20	Well suited	! !	Well suited	! !	Moderate   Low strength	10.50
	!	I I	 	I I	! !	Low strength	10.50
433301:	i	! 	! !	! 		! 	i
Kellogg	i 40	'  Moderatelv suited	i	Moderately suited	i	'  Moderate	i
33	i		0.50	=		Low strength	0.50
	I	l	I	=	0.50	i -	1
	I	I	I	I	I	I	1
Allendale	25	Well suited	I			Moderate	1
	1	<u> </u>	ļ	Slope	10.50	Low strength	10.50
			!		l		!
Ashwabay	20	well suited	I	·	•	Moderate	I  0.50
				Slope		Low strength	

Table 6.-Land Management, Part I (Planting)-Continued

	  Pct.   of	   Suitability fo:  hand planting		Suitability fo   mechanical plant		   Soil rutting haz 	ard
		Rating class and	•	Rating class and   limiting features	•	•	
	l	limiting features	<u> </u> 	IIMICING TEACURES	<u>                                     </u>	limiting features	<del> </del>
433304: Sedgwick	   50 	    Well suited 	:     	  Well suited 	   	  Moderate  Low strength	      0.50
Munuscong	   30 	  Well suited   	!     	  Well suited   	•	  Moderate   Low strength 	10.50
433305: Superior	     50 	    Well suited 	       	    Well suited 	•	    Moderate   Low strength	      0.50
Sedgwick	   30 	  Well suited 	!   	  Well suited 	 	  Moderate   Low strength	1 10.50
433309: Superior	     50 	    Well suited 	       	    Moderately suited   Slope 		    Moderate   Low strength 	      0.50
Sedgwick	,   30 	  Well suited   	   	Moderately suited   Slope 		Moderate   Low strength 	    0.50
433310:	i	İ	i	İ	i	i	i
Sultz	35   	Well suited   	   	•		Moderate   Low strength 	  0.50
Ashwabay	25 	Well suited 	 	•		Moderate   Low strength	  0.50
Rubicon	   20   	<del>-</del>	    0.50 	•		  Moderate   Low strength 	    0.50
433314:	l I	I 	! !	! 	! 	! 	
Manistee	40 	Well suited 	  -	Unsuited   Slope		Moderate   Low strength	  0.50
Kellogg		· -	    0.50 	Slope	•	  Moderate   Low strength 	    0.50
Ashwabay	   20 	  Well suited 	!   	  Unsuited   Slope	•	  Moderate   Low strength	    0.50
433326: Rubicon				<del>-</del>		    Moderate   Low strength 	      0.50
433379: Allendale	     80 	    Well suited 	     	,    Well suited   	•	    Moderate   Low strength	      0.50
433515: Lupton		<del>-</del>		<del>-</del>		  Severe   Low strength   Wetness	    1.00  0.50
Cathro				· -		  Severe   Low strength   Wetness 	  1.00  0.50

Table 6.—Land Management, Part I (Planting)—Continued

Map unit symbol and soil name	  Pct.   of	•		   Suitability fo:   mechanical plant:		   Soil rutting haz	ard
	map	Rating class and limiting features	Value		Value	Rating class and limiting features	•
433515: Tawas	   25   	·	      0.50		      0.75 	    Severe   Low strength   Wetness	      1.00  0.50
433572: Portwing			0.75	  Poorly suited   Stickiness; high   plasticity index	0.75	  Severe   Low strength 	      1.00
Herbster		·	0.50	  Moderately suited   Stickiness; high   plasticity index	0.50		    1.00
433573: Cornucopia	   80     	· <u>-</u>	0.75	Stickiness; high   plasticity index	0.75	ĺ	    1.00
433582: Croswell	     82 	    Well suited 	       	    Well suited 	       	    Moderate   Low strength	      0.50
433599: Annalake	   85 	    Well suited   	       	    Well suited   	     	    Moderate   Low strength 	      0.50
433600: Annalake	   80 	    Well suited   	     	    Moderately suited   Slope 		    Moderate   Low strength 	      0.50
433671: Arnheim	   85   	    Well suited   	       	  Well suited   	     	  Severe   Low strength 	      1.00
433676: Redrim	   85   	•	0.50	Rock fragments		  Slight   Strength 	    0.10
433679: Lapoin	     85   		0.50	    Moderately suited   Stickiness; high   plasticity index	0.50	    Severe   Low strength 	      1.00
433686: Zeba	     90 	    Well suited 	       	    Moderately suited   Rock fragments		    Moderate   Low strength	1 1 1 0 . 50
433729: Sultz	     85 	    Well suited   	       	    Well suited 	       	    Moderate   Low strength	      0.50
433739: Moquah	     85 	    Well suited   	     	    Well suited   	       	    Moderate   Low strength	      0.50
433771: Beaches	     97 	    Not rated 	     	    Not rated 	     	    Not rated 	     

Table 6.-Land Management, Part I (Planting)-Continued

	Pct. Of	·		Suitability for mechanical plants		Soil rutting haz 	ard
		Rating class and limiting features	Value		Value	Rating class and limiting features	
433802: Udorthents, ravines		 	   	 	   	 	 
and escarpments	85 	Not rated 	 	Not rated 	 	Not rated 	
452739: Water	I I 100	  Not rated	 	  Not rated	 	  Not rated	1
	1		İ		İ		i
452765: Abbaye	   55	  Well suited	 	  Well suited	 	  Severe	1
ADDAYE	33	 	! 	 	! 	Low strength	1.00
Lapoin	   40   	  Moderately suited   Stickiness; high   plasticity index	0.50	  Moderately suited   Stickiness; high   plasticity index	0.50	  Severe   Low strength 	    1.00
1383557:	İ	I 	! 	 	! 	l 	<u> </u>
Au Gres	85   	Well suited   	   	Well suited   	   	Moderate   Low strength 	  0.50
1383580: Loxley	   40 		      0.50	  Moderately suited   Wetness 	•	  Severe   Low strength   Wetness	    1.00  0.50
Beseman	   30   			  Moderately suited   Wetness 		  Severe   Low strength   Wetness	    1.00  0.50
Dawson	   28   		    0.50 	  Moderately suited   Wetness 		  Severe   Low strength   Wetness	  1.00  0.50
1383581: Rifle	   90   		      0.50 		      0.75 	  Severe   Low strength   Wetness	    1.00  0.50
1383603: Cornucopia	   80     	  Poorly suited   Stickiness; high   plasticity index	0.75	  Unsuited   Slope   Stickiness; high   plasticity index	1.00  0.75		    1.00 
1383658:	i	I 		 	 	l 	i
Deerton	50   	_	  0.50 	•		Moderate   Low strength 	  0.50 
Brownstone	40	<del>-</del>		•		  Slight   Strength	0.10
1383660: Deerton	   50   	_	      0.50 	Slope			      0.50
Brownstone	   40   	<del>-</del>	    0.50   	Slope	    0.75  0.50	· -	    0.10 

Table 6.—Land Management, Part I (Planting)—Continued

	Pct.   of			Suitability fo mechanical plant		Soil rutting hazard		
	-	Rating class and   limiting features		Rating class and   limiting features	•	Rating class and   limiting features		
1383662: Abbaye	     90 	    Well suited   	       	    Moderately suited   Slope		    Severe   Low strength	      1.00	
1383665: Allendale	   35 	    Well suited 	 	    Well suited 	 	  Moderate   Low strength	      0.50	
Wakeley	   30   	•	•	  Poorly suited   Wetness 	    0.75 	  Severe   Low strength   Wetness	    1.00  0.50	
Kinross	   20 	  Well suited 	 	  Well suited 	 	  Severe   Low strength	1 1.00	
1383960: Flink	     75 	    Well suited 	     	    Well suited   	     	    Moderate   Low strength	      0.50	
1444357: Arnheim	     85 	    Well suited 	     	    Well suited 	     	  Severe   Low strength	1 1.00	
1444359: Beaches	     97 	    Not rated 	!     	    Not rated 	     	    Not rated 		
1444367: Udorthents, ravines and escarpments		      Not rated 	       	  -    Not rated 	     	  -    Not rated 	;   	
1444378: Wakefield	   85 	  Well suited 	     	  Well suited 	     	  Severe   Low strength	      1.00	
1444379: Wakefield	     85 	    Well suited 	       	    Moderately suited   Slope 		    Severe   Low strength	1   1   1   1   1   1   1   1   1   1	
1444388: Allendale	   80 	    Well suited 	   	    Well suited 	   	  Moderate   Low strength	10.50	
1444402: Tonkey	   90 	    Well suited 	   	    Well suited 	   	  Moderate   Low strength	10.50	
1444410: Tula	     80 	- <u>-</u>		· -		    Moderate   Low strength	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
1444414: Lupton	     40 			    Poorly suited   Wetness 		    Severe   Low strength   Wetness	      1.00  0.50	
Cathro	   30   	- <u>-</u>		· -	•	  Severe   Low strength   Wetness	    1.00  0.50	
Tawas	   25   			——————————————————————————————————————	    0.75	  Severe	    1.00  0.50	

Table 6.-Land Management, Part I (Planting)-Continued

	Pct.   of	,   Suitability for   hand planting		Suitability for mechanical plant		   Soil rutting haz 	ard
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	l	limiting features	1	limiting features	1
	I	l	l	1	I	1	1
1444425:		1			1		1
Lerch		-		<del>-</del>		Severe	
	!			Stickiness; high			11.00
	!			plasticity index   Wetness	I 10.75		1
	;	wechess	U . 75 	Wechess	U . 75		<u> </u>
Herbster	i I 35	'  Moderatelv suited	i	  Moderatelv suited	i	  Severe	i
		Stickiness; high		<del>-</del>			11.00
	I	plasticity index	l	plasticity index	I	l	1
	I	I	l	l	I	l	1
1444426:		1			1		1
Portwing		-		· <u>-</u>	•	Severe	
	!	Stickiness; high				Low strength	11.00
	!	prasticity index	 	plasticity index	! !		1
Herbster	I 30	  Moderatelv suited	' 	  Moderately suited	i i	  Severe	i
		Stickiness; high		<del>-</del>			11.00
	ĺ			plasticity index		ĺ	İ
	I	l	l	1	I	l	1
1444427:	1	I	l	I	I	I	1
Cornucopia						Severe	
	!	Stickiness; high				Low strength	11.00
	!	plasticity index		plasticity index		] ]	!
	!	] 	 	Slope	0.50 		!
1444428:	i	İ	i		i		i
Cornucopia	80	Poorly suited	i i	Unsuited	i	Severe	i
_	I	Stickiness; high	0.75	Slope	11.00	Low strength	11.00
	I	plasticity index	l	Stickiness; high	0.75	l	1
	1	<u> </u>	l	plasticity index	1		1
1444421.	!		l		1		!
1444431: Croswell	I I 82	  Well suited	 	  Well suited	 	  Moderate	!
CIOSWEII	1 02	l surced	! !	Well Sulted	•	Low strength	10.50
	i	i	i		i		1
1444432:	i	İ	İ	İ	İ		i
Gogebic	85	Well suited	l	Moderately suited	I	Moderate	1
	1	<u> </u>	l	Rock fragments	10.50	Low strength	10.50
1444425	!				!		!
1444435: Iosco	Ι Ι Ω5	  Well suited	 	  Well suited	 	  Moderate	!
10300	1	l	' 	l	•	Low strength	10.50
	i	i	i	İ	i		i
1444457:	I	I	l	l	I	l	I
Redrim	85	Moderately suited	l	Poorly suited	I	Slight	1
	I		0.50	•		Strength	0.10
	!	Rock fragments	0.50	Sandiness	10.50	•	!
1444459:	I I	] 	l I	] 	I I	] 	1
Zeba	I I 90	ı  Well suited	! !	  Moderately suited	i İ	  Moderate	i
2020	1	l	i	<del>-</del>	10.50		0.50
	i		İ				
1444460:	l		I	l	I	l	I
Abbaye	55	Well suited	l	Well suited	I	Severe	1
	1	<u> </u>	l		I	Low strength	11.00
	1	I	I		I		1
Tamain	1 40	Distribution of the state of		District Control of the Control			
Lapoin	40	·		Moderately suited		Severe	11 00
Lapoin	   40 	  Moderately suited   Stickiness; high   plasticity index	0.50	_	0.50		  1.00

Table 6.—Land Management, Part I (Planting)—Continued

Map unit symbol and soil name	  Pct.   of	hand planting		Suitability fo   mechanical plant	ing	   Soil rutting haz 	
	-	Rating class and limiting features		Rating class and   limiting features	•	Rating class and   limiting features	
1444461: Abbaye	     55 	    Well suited 	 	    Moderately suited   Rock fragments		    Severe   Low strength	      1.00
Zeba	   40 	  Well suited 	 	  Moderately suited   Rock fragments	•	  Moderate   Low strength	    0.50
1444477: Cublake	     35 	    Well suited 	     	    Well suited 	     	    Moderate   Low strength	      0.50
Croswell	   20 	  Well suited 	 	  Well suited 	 	  Moderate   Low strength	    0.50
Ashwabay	    20   	  Well suited   	     	  Well suited   	     	  Moderate   Low strength 	    0.50
1444478: Cublake	   35 	  Well suited 	     	  Moderately suited   Slope		  Moderate   Low strength	      0.50
Croswell	   20 	  Well suited 	 	  Moderately suited   Slope		  Moderate   Low strength	    0.50
Ashwabay	   20 	  Well suited   	   	  Moderately suited   Slope	•	  Moderate   Low strength	    0.50
1444479: Morganlake	     85 	    Well suited   	     	    Well suited 	     	    Moderate   Low strength	10.50
1444480: Morganlake	     85 	    Well suited   	     	    Moderately suited   Slope		    Moderate   Low strength	10.50
1444481: Kellogg		· -	      0.50	    Moderately suited   Sandiness		    Moderate   Low strength	1 10.50
Allendale	25	  Well suited 	! 	Well suited 	! 	Moderate   Low strength	10.50
Ashwabay	   20 	  Well suited 	 	  Well suited 	 	  Moderate   Low strength	    0.50
1444482: Kellogg	   40 	· -	      0.50	•		    Moderate   Low strength 	      0.50
Allendale	   25 	  Well suited 	 	  Moderately suited   Slope	•	  Moderate   Low strength	    0.50
Ashwabay	   20 	  Well suited   	     	  Moderately suited   Slope	    0.50	  Moderate   Low strength	    0.50
1444486: Sedgwick	50	    Well suited 	       	    Well suited 	       	    Moderate   Low strength	1   1   1   1   1   1   1   1   1   1
Munuscong	30   	  Well suited   	       	  Well suited   	       	  Moderate   Low strength 	    0.50

Table 6.-Land Management, Part I (Planting)-Continued

	  Pct.   of		r	   Suitability fo:   mechanical plant		   Soil rutting haz 	   Soil rutting hazard 		
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	•		
1444487: Superior	     50 	    Well suited 	       	    Well suited 	•	    Moderate   Low strength	      0.50		
Sedgwick	   30 	  Well suited 	 	  Well suited 		  Moderate   Low strength	    0.50		
1444488: Superior	     50 	    Well suited 	     	    Moderately suited   Slope		    Moderate   Low strength	      0.50		
Sedgwick	   30 	  Well suited   	     	  Moderately suited   Slope 		  Moderate   Low strength 	    0.50		
1444489: Sultz	     35   	    Well suited   	'       	  -  Unsuited   Slope 		    Moderate   Low strength 	      0.50		
Ashwabay	25 	Well suited   	   		•	Moderate   Low strength	  0.50		
Rubicon	   20   	  Moderately suited   Sandiness 			•	  Moderate   Low strength 	  0.50		
1444492: Manistee	     40 	    Well suited 	     	•	•	    Moderate   Low strength	      0.50		
Kellogg	30   	Moderately suited   Sandiness 		Slope	•	Moderate   Low strength 	  0.50		
Ashwabay	I   20   	  Well suited   	     	•		  Moderate   Low strength 	    0.50		
1444506: Keweenaw	   60 	  Well suited 	     	  Well suited 		  Moderate   Low strength	    0.50		
Rubicon	I   30   	•	I    0.50 	  Moderately suited   Sandiness 		  Moderate   Low strength 	    0.50		
1444507: Keweenaw	   60 	  Well suited 	 	  Moderately suited   Slope		  Moderate   Low strength	    0.50		
Rubicon	1   30     		I    0.50   	•		  Moderate   Low strength   	    0.50 		
1444585: Meehan, beaches	   90 		    0.50	•		  Moderate   Low strength 	      0.50		
1444586: Wurtsmith, beaches			    0.50		    0.50	  Moderate   Low strength 	    0.50		

Table 6.—Land Management, Part I (Planting)—Continued

	  Pct.   of	   Suitability fo   hand planting		Suitability fo   mechanical plant		Soil rutting hazard		
		Rating class and	•		•	Rating class and	•	
	lunit	limiting features	<u> </u>	limiting features	<del> </del>	limiting features	<del> </del>	
1444587: Grayling, beaches	   95     	    Moderately suited   Sandiness   		Sandiness		Low strength	      0.50	
1529830: Meehan, beaches				    Moderately suited   Sandiness 			      0.50	
1700372: Loxley					10.50	    Severe   Low strength   Wetness	    1.00  0.50	
Beseman		<del>-</del>			10.50	  Severe   Low strength   Wetness	    1.00  0.50	
Dawson						  Severe   Low strength   Wetness	    1.00  0.50	
1700373: Rifle	     90   			    Poorly suited   Wetness 		  Severe   Low strength   Wetness	    1.00  0.50	
1700374: Allendale	     35 	    Well suited 	     	    Well suited 	•	    Moderate   Low strength	      0.50	
Wakeley	   30   			•	0.75	  Severe   Low strength   Wetness	    1.00  0.50	
Kinross	   20   	  Well suited   	     	  Well suited   	     	  Severe   Low strength 	    1.00	
1702605: Menominee	   85 	     Well suited   	 	  Poorly suited   Slope	•	  Moderate   Low strength	      0.50	
1702606: Deerton	   50   	<del>-</del>	      0.50		    0.50  0.50	<del>-</del>	    0.50	
Brownstone	   40 	<del>-</del>		  Poorly suited   Rock fragments 		  Slight   Strength 	1   0.10	
1702607: Deerton	   50     	<del>-</del>	      0.50 	  Moderately suited   Rock fragments   Slope   Sandiness	0.50  0.50  0.50		    0.50	
Brownstone		<del>-</del>	    0.50   	  Poorly suited   Rock fragments   Slope 	0.75  0.50	  Slight   Strength   	    0.10 	

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Table 6.-Land Management, Part I (Planting)-Continued

	1	I				l			I	
Map unit symbol	Pct.	I	Suitabilit	y fo	r	Suitabi	lity fo	r	Soil rutting ha:	zard
and soil name	of	I	hand plan	ting		mechanica	l plant	ing	I	
	map	Ra	ting class	and	Value	Rating cla	ss and	Value	Rating class and	Value
	unit	lim	iting featu	res	I	limiting fe	atures	1	limiting features	1
	1	I			1	I		1	I	1
1702608:	I	1			1	l		1	I	1
Abbaye	90	Well	suited		1	Moderately s	uited	1	Severe	1
	I	I			1	Slope		0.50	Low strength	11.00
	I	1			1	l		1	I	1
1711685:	I	I			I	l		1	I	1
Cublake	50	Well	suited		I	Well suited		1	Moderate	1
	I	I			I	l		1	Low strength	10.50
	I	I			I	l		1	I	1
Keweenaw	30	Well	suited		I	Well suited		I	Moderate	1
	I	I			1	l		1	Low strength	10.50
	I	I			1	l		1	l	1

Table 6.-Land Management, Part II (Hazard of Erosion and Suitability for Roads)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

	  Pct.   of	•	on	Hazard of erosion roads and trai		Suitability for r	
	map	·	IValue	<del>'                                    </del>		<del></del>	
	-	limiting features		limiting features		limiting features	
433292:	1	] !	1	  -	  -		1
Lerch		l ISliabt	-	  Slight	!	  Poorly suited	:
nerch	1 30	ı	<u> </u>	ı	! !	Ponding	11.00
	!	! !	!	 	!	•	11.00
	;	! !	;	! 	! !	Stickiness; high	•
	<u> </u>	! 	i	! 		plasticity index	
	i		i	' 	i	Low strength	10.50
	1	l	I	l	I	I	I
Herbster	35	Slight	1	Slight	I	Moderately suited	1
	l	I	1	l	I	Low strength	10.50
			1		!	Wetness	10.50
433296:	 	! 	<u> </u>	 	! !	! 	<u> </u>
Cublake	35	Slight	i	Slight	İ	  Well suited	i
	Ι	l	I	l	I	I	I
Croswell	20	Slight	1	Slight	<u> </u>	Well suited	1
Ashwabay	20	  Slight	<u> </u>	ı  Slight	! 	  Well suited	;
_	l	I	1	I	I	I	1
433299:		1	1	<u> </u>	l	1	1
Cublake	35	Slight	1	Moderate		Moderately suited	1
		<u> </u>	!	Slope/erodibility	10.50	Slope	10.50
Croswell	l 20	ι  Sliαht	i	  Moderate	! !	  Moderately suited	i
	i	İ	i	Slope/erodibility	0.50		0.50
		<u> </u>	1	<u> </u>	I	1	1
Ashwabay	20	Slight	1	Moderate		Moderately suited	
		 	1	Slope/erodibility	10.50	Slope	10.50
433300:	i	! 	i	 	! 	! 	i
Kellogg	35	Slight	i	Slight	İ	Moderately suited	İ
	I	l -	1	I	I	Sandiness	10.50
		l	1	l	I	Wetness	10.50
222 - 4-2 -			!		l	186.4	I
Allendale	25	Slight	!	Slight	!	Moderately suited   Wetness	  0.50
	l I	! 	<u> </u>	l 	! !	wethess	10.50 I
Ashwabay	20	'  Slight	i	'  Slight	i	  Well suited	i
	l	l -	1	I	I	I	1
433301:	1	I	1	I	I	I	I
Kellogg	40	Slight	1	Moderate		Moderately suited	1
		<u> </u>		Slope/erodibility	0.50	•	10.50
	!	!	!	<u> </u>	!	Sandiness	10.50
	 	 	!	İ	 	Wetness	10.50
Allendale	25	,  Slight	i	  Moderate		  Moderately suited	i
	I	ı	I	Slope/erodibility	0.50		0.50
	l	l	I	·	I	Wetness	0.50
			!		!	1	!
Ashwabay	ı 20	ISLIaht	1	Moderate	I	Moderately suited	1
nsnwabay			:	Slope/erodibility			0.50

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

and soil name	  Pct.   of			   Hazard of erosion   roads and trai	ls	   Suitability for roads   (natural surface)		
	map  unit	Rating class and   limiting features	•	Rating class and   limiting features		Rating class and   limiting features		
433304: Sedgwick	   	 	   	  -  Moderate   Slope/erodibility	     	  -  Poorly suited	      1.00  0.01	
Munuscong	   30     	  Slight     	       	  Slight     		  Poorly suited   Wetness   Ponding   Dusty	  1.00  0.50  0.01	
433305: Superior	     50   	    Slight   	 	    Moderate   Slope/erodibility 		    Moderately suited   Wetness   Dusty	      0.50  0.01	
Sedgwick	   30   	  Slight   	       	  Slight   		  Poorly suited   Wetness   Dusty	  1.00  0.01	
433309: Superior	   50     	    Moderate   Slope/erodibility   	•	    Severe   Slope/erodibility   		  -  Moderately suited   Slope   Wetness   Dusty	    0.50  0.50  0.01	
Sedgwick	   30     	  Slight     	 	  Moderate   Slope/erodibility     		  Poorly suited   Wetness   Slope   Dusty	  1.00  0.50  0.01	
433310: Sultz	     35 	•	•	    Severe   Slope/erodibility		    Poorly suited   Slope	      1.00	
Ashwabay	   25 		•	  Severe   Slope/erodibility		  Poorly suited   Slope	    1.00	
Rubicon	   20   	•	•	  Severe   Slope/erodibility   	•	  Poorly suited   Slope   Sandiness	  1.00  0.50	
433314: Manistee	   40 	•	•	    Severe   Slope/erodibility		  -  Poorly suited   Slope	    1.00	
Kellogg	   30     	   Moderate   Slope/erodibility 	•	   Severe   Slope/erodibility   		_	  1.00  0.50  0.50	
Ashwabay	   20 	  Moderate   Slope/erodibility 	•	  Severe   Slope/erodibility 		  Poorly suited   Slope 	    1.00	
433326: Rubicon	   85 	  Slight 	     	    Slight 	     	    Moderately suited   Sandiness	      0.50	
433379: Allendale	     80 	    Slight   	       	    Slight   	       	    Moderately suited   Wetness 	      0.50	

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

map   Rating	class and  Va	lue   Rating class and	•	limiting features        Poorly suited   Low strength   Wetness	•
433515:       Lupton  40  Slight                               Cathro  30  Slight		  Slight                Slight   			   1.00  1.00  0.50  0.01     1.00  1.00
Lupton 40   Slight		        Slight       		Low strength   Wetness   Ponding   Dusty    Poorly suited   Low strength   Wetness   Ponding	1.00  0.50  0.01      1.00  1.00
Lupton 40   Slight		        Slight       		Low strength   Wetness   Ponding   Dusty    Poorly suited   Low strength   Wetness   Ponding	1.00  0.50  0.01      1.00  1.00
Cathro 30  Slight		        Slight       		Low strength   Wetness   Ponding   Dusty    Poorly suited   Low strength   Wetness   Ponding	1.00  0.50  0.01      1.00  1.00
		 		Wetness   Ponding   Dusty    Poorly suited   Low strength   Wetness   Ponding	1.00  0.50  0.01      1.00  1.00
		 		Ponding Dusty  Poorly suited Low strength Wetness Ponding	0.50  0.01        1.00
		 		Dusty    Poorly suited   Low strength   Wetness   Ponding	0.01      1.00  1.00
		 		  Poorly suited   Low strength   Wetness   Ponding	    1.00  1.00
		 	 	Low strength   Wetness   Ponding	11.00
	         	 	         	Low strength   Wetness   Ponding	11.00
	         	        Slight	       	Wetness   Ponding	11.00
               Tawas  25  Slight 	         	        Slight		Ponding	
           Tawas  25  Slight     	       	      Slight		•	10.50
         Tawas  25  Slight 	     	    Slight	 	I Duets	
 Tawas  25  Slight 	 	  Slight		, Duscy	0.01
Tawas  25  Slight	 	Slight	1	I	1
	1		1	Poorly suited	1
į į			1	Low strength	11.00
	1	i	i	Wetness	11.00
1 1	i	i	i		0.50
i i	i	i	i	Dusty	10.01
ii	i	i	i	1	1
433572:	<u> </u>		;		;
Portwing   50   Slight	<u> </u>	  Moderate	;	Moderately suited	;
POICWING			-10 50	=	10.50
! !		Slope/erodibility	710.50	Low strength	10.50
	!	101:-1-1	!	lagrada estada en 11 a d	!
Herbster  30  Slight	!	Slight	!	Moderately suited	!
<u> </u>	!		1	Low strength	10.50
!!!			1	Wetness	10.50
1 1	1	ı	1	1	1
433573:	I	I	1	I	1
Cornucopia  80   Moderate	·	Severe	1	Moderately suited	1
Slope/	erodibility 0.	50   Slope/erodibility	7 0.95	Slope	10.50
1 1	I	1	1	Low strength	10.50
I I	1	I	1	I	1
433582:	1	1	1	I	1
Croswell  82  Slight	1	Slight	1	Well suited	1
i i	i	i	i	İ	i
433599:	i	i	i	İ	i
Annalake 85  Slight	i	Moderate	i	Well suited	i
i i	i	Slope/erodibility	z10.50	i	i
i i	i		1	i	i
433600:	i	i	i	i	i
Annalake  80  Slight	i	  Severe	i	Moderately suited	i
I I	<u> </u>	Slope/erodibility	, ,10 05	· <u>-</u>	10.50
		Slope/elodibility	710.93	1 STOPE	10.50
422671		1	!	1	!
433671:	!	101:-1-1	!	lagrada estada en 11 a d	!
Arnheim  85  Slight	!	Slight	!	Moderately suited	
!!!			1	Low strength	10.50
1 1	ı	I	1	Ponding	10.50
1 1	1	ı	1	Flooding	10.50
1 1	l	I	1	Wetness	10.50
I I	1	1	1	Dusty	0.01
1 1	1	I	1	I	1
433676:	1	I	1	I	1
Redrim  85  Slight	1	Slight	1	Moderately suited	1
1 1	1	1	1	Sandiness	10.50
j j	İ	1	I	I	I
433679:	i	i	i	I	1
Lapoin 85  Slight	i	  Moderate	i	  Moderately suited	i
	i	Slope/erodibility	zi0.50	· <u>-</u>	0.50
	<u>'</u>		1	Wetness	10.50
	!	i	1	1	1

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

	ī		 <u> </u>		<u> </u>		
and soil name	Pct.   of	i	 Hazard of erosion	ls	Suitability for roads   (natural surface)		
		Rating class and     limiting features	Rating class and   limiting features	•	Rating class and   limiting features	•	
433686:	I I	 	 	I I	 	T I	
Zeba	90 	Slight   	  Moderate   Slope/erodibility 		Moderately suited   Wetness	  0.50	
433729:	i	i i	i İ	i	İ	i	
Sultz	85	Slight	Slight		Well suited	1	
433739:	<u> </u>	;	! 	! !	! 	i .	
Moquah	85   	Slight   	Slight     	     	  Moderately suited   Flooding   Dusty	  0.50  0.01	
433771: Beaches	97		    Not rated	! 	    Not rated		
433802: Udorthents, ravines and escarpments			      Not rated	     	      Not rated	     	
	i	i i	I	i		i	
452739: Water	   100	  Not rated   	  Not rated 	   	  Not rated 	 	
452765: Abbaye	   55 		    Slight 	   	    Moderately suited   Wetness	    0.50	
Lapoin	   40 		  Moderate   Slope/erodibility 		  Moderately suited   Low strength   Wetness	    0.50  0.50	
1383557: Au Gres	     85		    Slight	     	    Well suited 	 	
1383580: Loxley	   40     		    Slight     	;         	  Poorly suited   Low strength   Wetness   Dusty	    1.00  1.00  0.01	
Beseman	   30   		  Slight   	     	  Poorly suited   Low strength   Wetness	    1.00  1.00	
Dawson	   28     	  Slight         	  Slight     	       	  Poorly suited   Low strength   Wetness   Dusty	  1.00  1.00  0.01	
1383581: Rifle	     90     		    Slight     	         	  Poorly suited   Low strength   Wetness   Ponding	    1.00  1.00  0.50	
1383603: Cornucopia	       80     	 	    -  Severe   Slope/erodibility   		Dusty        Poorly suited	0.01        1.00  0.50	

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct.   of	l		Hazard of erosion	ls	Suitability for r   (natural surfac	e)
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1383658: Deerton	     50	    Slight 	       	    Slight 	       	    Moderately suited   Sandiness	      0.50
Brownstone	   40 	  Slight 	   	  Slight 	   	  Well suited 	   
1383660:	i	İ	i	i I	i	i	i
Deerton	50   	Slight   	     	  Moderate   Slope/erodibility 		Moderately suited   Slope   Sandiness	  0.50  0.50
Brownstone	   40 	  Slight   	     	  Moderate   Slope/erodibility 		  Moderately suited   Slope 	    0.50
1383662: Abbaye	   90   	  Slight   	         	  Moderate   Slope/erodibility 		  Moderately suited   Slope   Wetness	    0.50  0.50
1383665: Allendale	   35 	  Slight 	   	    Slight 	   	  Moderately suited   Wetness	      0.50
Wakeley	   30   	  Slight   	     	  Slight   	     	  Poorly suited   Ponding   Wetness	    1.00  1.00
Kinross	   20     	  Slight     	         	  Slight       	 	  Poorly suited   Low strength   Wetness   Ponding	  1.00  1.00  0.50
1383960: Flink	   75 	     Slight	   	  Slight 	   	  Well suited 	 
1444357: Arnheim	   85         	  Slight       	 	  Slight           	             	  Moderately suited   Low strength   Ponding   Flooding   Wetness   Dusty	   0.50  0.50  0.50  0.50  0.50
1444359: Beaches	     97	    Not rated 	'     	    Not rated 	   	    Not rated 	   
1444367: Udorthents, ravines		 	 	  -	 	i I	i I
and escarpments	85 	Not rated 	 	Not rated 	 	Not rated 	 
1444378: Wakefield	   85   	  Slight   	     	  Moderate   Slope/erodibility 		  Moderately suited   Low strength   Wetness	    0.50  0.50
1444379: Wakefield	   85     	  Slight        	 	    Severe   Slope/erodibility     		  -  Moderately suited   Slope   Low strength   Wetness 	      0.50  0.50  0.50

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

and soil name	Pct. of	i 		Hazard of erosion	Ls	(natural surfac	e)
	_	Rating class and  V   limiting features		Rating class and     limiting features		Rating class and   limiting features	•
1444388:		 		 		]   	   
Allendale	80	Slight		  Slight		Moderately suited	i
						_	0.50
   1444402:				 		 	 
Tonkey	90	Slight		Slight		Poorly suited	1
I		l I		l I		Wetness	1.00
I		l I		l I		Ponding	0.50
	 	 				Dusty 	0.01
1444410:		i		i		İ	i
Tula	80	Slight		Slight		Well suited	
		 				Dusty 	0.01 
1444414:	40					 	İ
Lupton	40	Slight		Slight		Poorly suited	1 00
!		!!!					11.00
		:					1.00  0.50
· ·						•	0.01
i		i i		i		Ī	i
Cathro	30	Slight		Slight		Poorly suited	1
<u> </u>							11.00
		!!!					11.00
!		!				•	10.50
		 				Dusty 	0.01 
Tawas	25	Slight		Slight		Poorly suited	į.
		! !					11.00
!		!!!					11.00
						•	0.50  0.01
144405		į				<u>-</u>	İ
1444425:     Lerch	50	  Slight		  Slight		  Poorly suited	 
i		i i		i		=	11.00
ı		I I		l I		Wetness	1.00
I		I I		l I		Stickiness; high	10.50
!						plasticity index	  0.50
i						Low strength 	U.50
Herbster	35	Slight		Slight		Moderately suited	
<u> </u>							10.50
		 				Wetness 	0.50 
1444426:							İ
Portwing	50			Moderate   Slope/erodibility		Moderately suited   Low strength	I  0.50
i		i i					1
Herbster	30	Slight		Slight		Moderately suited	1
I		l I				·	0.50
		 		 		Wetness	0.50 
						! 	i
•				Severe		Moderately suited	1
1444427:     Cornucopia	80	Moderate				- <u>-</u>	
•	80	Moderate				Slope	10.50
•	80					Slope	0.50  0.50 
Cornucopia   	 	Slope/erodibility 0         	.50	Slope/erodibility     	0.95	Slope   Low strength 	
Cornucopia         	 	Slope/erodibility 0                  Severe	.50	Slope/erodibility            Severe	0.95	Slope   Low strength        Poorly suited	0.50     
-    -           	 	Slope/erodibility 0         	.50	Slope/erodibility            Severe	0.95	Slope   Low strength        Poorly suited   Slope	

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	  Pct.   of	•	   Hazard of erosion 		n on ls	   Suitability for roads   (natural surface)		
	map	-		=		•	•	
	unit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	<del> </del>	
1444431: Croswell	     82 	    Slight 	     	    Slight 	     	    Well suited 	     	
1444432:	   05	'    Climbt	į	    Moderate	İ	    Moderately suited	į	
Gogebic	00	   	! 	Slope/erodibility		•	10.50	
1444435:	i	' 		i I	' 	i I	i	
Iosco	85 	Slight   		Slight 	 	Moderately suited   Wetness	10.50	
1444457:	¦ .	I 	i	 	 	 		
Redrim	85 	Slight   		Slight 	 	Moderately suited   Sandiness	  0.50	
1444459:		 	 	 	 	 		
Zeba	90 	Slight   	 	Moderate   Slope/erodibility		Moderately suited   Wetness	  0.50	
1444460:	i	! 	i	! 	! 	İ	i	
Abbaye	55 	Slight   	 	Slight 	 	Moderately suited   Wetness	  0.50	
Lapoin	   40 	  Slight 	 	  Moderate   Slope/erodibility		•	1 10.50	
		I 	 	 	 	Wetness 	0.50 	
1444461: Abbaye	   55 	  Slight 	   	  Slight 	   	  Moderately suited   Wetness	    0.50	
Zeba	   40 	  Slight 	     	  Moderate   Slope/erodibility		  Moderately suited   Wetness	    0.50	
1444477:	i .	! 	İ	İ	! 	İ	i	
Cublake	35 	Slight 	 	Slight 	 	Well suited	 	
Croswell	20 	Slight 	l I	Slight	 	Well suited	 	
Ashwabay	20	  Slight 	!	  Slight 	!   	  Well suited		
1444478:	i .	i I	i	i I	İ	İ	i	
Cublake	35 	Slight   	 	Moderate   Slope/erodibility		Moderately suited   Slope	  0.50	
Croswell	   20 	  Slight 	   	  Moderate   Slope/erodibility	    0.50	  Moderately suited   Slope	    0.50	
Ashwabay	   20	  Slight 	   	  Moderate   Slope/erodibility	    0 50	  Moderately suited   Slope	    0.50	
	į	İ	į					
1444479: Morganlake	   85 	  Slight 	 	  Slight 	   	  Moderately suited   Wetness	    0.50	
1444480: Morganlake	   85 	    Slight   	         	    Moderate   Slope/erodibility 		    Moderately suited   Slope   Wetness	      0.50  0.50	
	       85   	      Slight     	 			      Moderately suited   Slope		

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	  Pct.   of	•	on	   Hazard of erosion   roads and trai		   Suitability for roads   (natural surface)		
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features		
1444481: Kellogg	     35   	    Slight   	       	    Slight   	       	    Moderately suited   Sandiness   Wetness	      0.50  0.50	
Allendale	   25 	  Slight 	! ! !	  Slight 	!   	  Moderately suited   Wetness	    0.50	
Ashwabay	   20 	  Slight 	! 	  Slight 	   	  Well suited 		
1444482: Kellogg	   40   	    Slight     	;           	    Moderate   Slope/erodibility   		  Moderately suited   Slope   Sandiness   Wetness	    0.50  0.50	
Allendale	   25 	  Slight   	 	  Moderate   Slope/erodibility 		  Moderately suited   Slope   Wetness	    0.50  0.50	
Ashwabay	   20 	  Slight 	 	  Moderate   Slope/erodibility		  Moderately suited   Slope	    0.50	
1444486: Sedgwick	     50 	    Slight   	       	    Moderate   Slope/erodibility 	•	    Poorly suited   Wetness   Dusty	      1.00  0.01	
Munuscong	   30     	  Slight     	       	  Slight     	       	  Poorly suited   Wetness   Ponding   Dusty	  1.00  0.50  0.01	
1444487: Superior	     50 	    Slight   	       	    Moderate   Slope/erodibility 		    Moderately suited   Wetness   Dusty	      0.50  0.01	
Sedgwick	   30   	  Slight   	     	  Slight   	     	  Poorly suited   Wetness   Dusty	  1.00  0.01	
1444488: Superior	   50     	    Moderate   Slope/erodibility   		  -  Severe   Slope/erodibility  - 			    0.50  0.50	
Sedgwick	   30       	  Slight       	         	  Moderate   Slope/erodibility     		  Poorly suited   Wetness   Slope   Dusty 	  1.00  0.50  0.01	
1444489: Sultz	   35	  Moderate   Slope/erodibility	•	  Severe   Slope/erodibility		  Poorly suited   Slope	      1.00	
Ashwabay	   25   	  Moderate   Slope/erodibility 	•	  Severe   Slope/erodibility 		  Poorly suited   Slope 	    1.00	

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

	  Pct.   of	•	on		Hazard of erosion on   roads and trails		Suitability for roads (natural surface)	
	-	Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features		
1444489: Rubicon	     20   	    Moderate   Slope/erodibility 	•	    Severe   Slope/erodibility   		    Poorly suited   Slope   Sandiness 	    1.00  0.50	
1444492:	i	i I	i	i	i	I	i	
Manistee	40 	Moderate   Slope/erodibility 	•	Severe   Slope/erodibility 	•	Poorly suited   Slope 	11.00	
Kellogg	30       		•	  Severe   Slope/erodibility   		Poorly suited   Slope   Sandiness   Wetness	  1.00  0.50  0.50	
Ashwabay	   20   	  Moderate   Slope/erodibility 	•	  Severe   Slope/erodibility 		  Poorly suited   Slope 	    1.00	
1444506: Keweenaw	   60 	  Slight 	   	  Slight 	   	  Well suited 	 	
Rubicon	30 	Slight 	   	Slight   	   	Moderately suited   Sandiness	    0.50	
1444507: Keweenaw	   60 	    Slight 	:     	     Moderate   Slope/erodibility		    Moderately suited   Slope	      0.50	
Rubicon	   30   	  Slight   	       	  Moderate   Slope/erodibility 	    0.50 	  Moderately suited   Slope   Sandiness	    0.50  0.50	
1444585: Meehan, beaches	     90 	    Slight   	       	    Slight   	       	    Moderately suited   Sandiness 	      0.50	
1444586: Wurtsmith, beaches	   90 	  Slight 	   	  Slight 	   	  Moderately suited   Sandiness	    0.50	
1444587: Grayling, beaches	     95   	    Slight     	         	    Moderate   Slope/erodibility   	•	    Moderately suited   Sandiness   Slope 	      0.50  0.50	
1529830: Meehan, beaches	   90 	  Slight 	   	    Slight 	     	  Moderately suited   Sandiness	      0.50	
1700372: Loxley	   40     	    Slight     	 	    Slight     	         	  -  Poorly suited   Low strength   Wetness   Dusty	    1.00  1.00  0.01	
Beseman	   30   	  Slight   	     	  Slight   	     	  Poorly suited   Low strength   Wetness	    1.00  1.00	
Dawson	   28       	  Slight       	 	  Slight       	 	  Poorly suited   Low strength   Wetness   Dusty 	  1.00  1.00  0.01	

Table 6.—Land Management, Part II (Hazard of Erosion and Suitability for Roads)—Continued

Map unit symbol and soil name	Pct.	•	on	Hazard of erosion roads and trai		.   Suitability for r   (natural surfac	
	map	·	IValue	<del>` </del>		<del>`</del>	
	-	limiting features		limiting features		limiting features	
1700373:	1	 	1	 	1	 	I
Rifle	-1 90	ı ISliaht	<u> </u>	  Slight	i	  Poorly suited	i
11110	1	l	;	l	<u> </u>	Low strength	11.00
	i	i i	i	i i	i	Wetness	11.00
	i	i i	i	i	i	Ponding	10.50
	i	i İ	i	İ	i	Dusty	0.01
1700074	!	<u> </u>	I	!	Į.	!	!
1700374: Allendale	 -  35	  Slight		  Slight	 	  Moderately suited	!
Allendale	1 33	l	i	l	i I	Wetness	10.50
	i	İ	i	İ	i	İ	İ
Wakeley	-  30	Slight	I	Slight	I	Poorly suited	1
	1	I	I	I	I	Ponding	11.00
	1	<u> </u>				Wetness	1.00
Kinross	-  20	  Slight	i	  Slight	 	  Poorly suited	i
	Ì	ĺ	İ	i	İ	Low strength	11.00
	1	l	I	I	I	Wetness	1.00
	1	l	l	I	I	Ponding	10.50
1702605:	!				I		!
Menominee	I - I 85	  Moderate		  Severe	 	  Poorly suited	!
Tieriom Tiree	1	Slope/erodibility	•	•		•	11.00
	İ	Ī	Ì	Ī	İ	İ	İ
1702606:	1	I	I	I	I	I	I
Deerton	-  50	Slight	!	Slight	!	Moderately suited	
		 		 	 	Sandiness	10.50
Brownstone	-  40	  Slight	i	  Slight	i	  Well suited	i
	İ	İ	Ì	ĺ	İ	Ī	Ì
1702607:			!		!		!
Deerton	-1 20	Slight	!	Moderate		Moderately suited	I 10.50
	-	! !	!	Slope/erodibility	10.50	Slope   Sandiness	10.50
	i	! 	i	! 	i I	Sandiness	10.50
Brownstone	-  40	Slight	i	  Moderate	i	  Moderately suited	i
	1	l -	l	Slope/erodibility	0.50	Slope	10.50
1700600.	!				I		!
1702608: Abbaye	. I . O.O.	  Cliab+	!	  Moderate	!	  Moderately suited	!
ADDaye	1	I STIGHT		Slope/erodibility		_	10.50
	i	' 	i	blope/elodibility	1	Wetness	10.50
1711005	!	! :	ļ	!		!	!
1711685:	   F0	 	I	 	1	  Well emited	1
Cublake	1 20	l lottdur	1	Slight 	I I	Well suited	1
Keweenaw	- 30	,  Slight	i	  Slight	i	  Well suited	i
	i	i I	i	i I	i	I	i

Table 6.-Land Management, Part III (Site Preparation)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

	•	Suitability for		Suitability for			
	Pct.			mechanical site			
				preparation (surfa			
	_	_		Rating class and     limiting features			
	i unii c	IIMICING Teacures	<u> </u>	I IIMICING TEACUTES	<u>'</u>		
433292:	<u> </u>	! !	! !	! !	! !		
Lerch	I 50	'  Unsuited	i	Poorly suited	i		
	i	•		_	0.75		
	ĺ	İ	İ	Stickiness; high	0.50		
	I	I	I	plasticity index	I		
	I	I	I	<b>I</b>	l		
Herbster	35			Poorly suited			
	!	Wetness	11.00	Stickiness; high			
	!	] 	!	plasticity index	! !		
433296:	<u> </u>	! !	! !	! !	! !		
Cublake	i i 35	'  Well suited	i	Well suited	i		
	i	İ	i	İ	i İ		
Croswell	20	Well suited	İ	Well suited	ĺ		
	I	I	I	<b>I</b>	I		
Ashwabay	20	Well suited	I	Well suited	I		
	I	I	I	<b>I</b>	I		
433299:	l	<u> </u>	!	<u> </u>	!		
Cublake	35	Well suited	!	Well suited	!		
Croswell	1 20	  Well suited	!	  Well suited	! !		
CIOSWell	1 20	Well Sulted	! !	Well Sulted	! !		
Ashwabay	1 20	Well suited	i	  Well suited			
<u>-</u>	i	I	i	I	i		
433300:	I	l	I	<b>I</b>	I		
Kellogg	35	Well suited	I	Well suited	I		
		1	I	<u> </u>	l		
Allendale	25			Well suited	!		
	!	Wetness	11.00		!		
Ashwabay	1 20	l  Well suited	! !	  Well suited	l I		
nsiiwabay	1 20	l	i	l			
433301:	i	i i	i	i i	i		
Kellogg	40	Well suited	İ	Well suited	İ		
	I	I	I	<b>I</b>	I		
Allendale	25			Well suited	I		
	1	Wetness	11.00	<u>!</u>	l		
	1	l 	!		!		
Ashwabay	20	Well suited	!	Well suited	!		
433304:		! !	! !	! !	! !		
Sedgwick	I 50	ı  Well suited	i i	  Well suited	! !		
<b></b>			i		i		
Munuscong	30	Unsuited	İ	Well suited	İ		
	l	Wetness	11.00		I		
	l	l	I		I		
433305:		 	!		!		
Superior	50	Well suited	I	Well suited	ļ		
Sodowi ok -	1 30 1	  Woll quited	I	  Woll quited	l I		
Sedgwick	1 30	lwerr surcea	! !	Well suited	! !		
	1	ı	ı	1	1		

Table 6.—Land Management, Part III (Site Preparation)—Continued

	l  Pct.	Suitability for mechanical site		mechanical site		
and soil name	of	preparation (de	ep)	preparation (surf	ace)	
	_	Rating class and limiting features		<del>-</del>		
	l	IIMICING TEACURES	<u> </u> 	IIMITCING TEACURES	<del></del>	
433309:	İ	İ	İ	İ	İ	
Superior	50			Well suited	1	
Sedgwick	   30		 	  Well suited 		
433310:	! 	! 	! 	! 	i	
Sultz	35			Poorly suited	I	
		Slope	10.50	Slope	10.50	
Ashwabay	1 25	  Poorly suited	i i	  Poorly suited	i	
					10.50	
Dubina			I		1	
Rubicon	20 	-		Poorly suited   Slope	1 10.50	
	i		İ		İ	
433314:		l	!	l	!	
Manistee	40 			Poorly suited   Slope	I 10.50	
	' 	blope	l	blobe	1	
Kellogg		-		Poorly suited	I	
		Slope	10.50	Slope	10.50	
Ashwabay	I I 20	  Poorlv suited	! !	  Poorly suited	1	
			•		0.50	
400006	!	<u> </u>	!	! :	!	
433326: Rubicon	l I 85	  Well suited	 	  Well suited		
			i		i	
433379:		<u> </u>	I	<u> </u>	!	
Allendale			  1.00	Well suited	1	
	i		1	i İ	i	
433515:		l 	!	l	!	
Lupton				Poorly suited   Wetness	I 10.50	
	İ		1		1	
Cathro	:	•		Poorly suited	1	
	 	Wetness	11.00	Wetness	10.50	
Tawas	25	  Unsuited	i	Poorly suited	i	
	l	Wetness	11.00	Wetness	10.50	
433572:	 	 	1	 	1	
Portwing	50	  Unsuited	i	Poorly suited	i	
-	ĺ		11.00	Stickiness; high		
				plasticity index	1	
Herbster	I I 30	  Unsuited	! !	  Poorly suited	i	
	İ		11.00	_	0.50	
		] !		plasticity index	I	
433573:	 	I 	! !	! 		
Cornucopia	80	Well suited	i	Poorly suited	i	
	l	<u> </u>	!	Stickiness; high		
	i I	 	I I	plasticity index	1	
433582:	i		i	I	i	
Croswell	82	Well suited	ļ.	Well suited	!	
433599:	i I	 	i I	] 	1	
Annalake	85	Well suited	i	  Well suited	i	
	I	I	I	I	I	

Table 6.-Land Management, Part III (Site Preparation)-Continued

	<u> </u>	Suitability fo		Suitability fo	
Map unit symbol	  Pct.	mechanical site	e	mechanical site	
				preparation (surfa	
	map	Rating class and		Rating class and	
	unit	limiting features	<u> </u>	limiting features	<u> </u>
422600	!	<u> </u>	1		l
433600: Annalake	   80	  Well suited	I I	  Well suited	! !
Amarake	1	l	i	l	! !
433671:	i	i I	i	i I	i
Arnheim	85	•		Well suited	I
	1	Wetness	11.00	] :	!
433676:	!	1	1	] ]	 
Redrim	I 85	ı  Well suited	i	  Poorly suited	! !
	i	I	i		0.50
	I	I	I	Ī	I
433679:		!	1	<u> </u>	1
Lapoin	85	Well suited	!	Well suited	!
433686:		 	 	 	! !
Zeba	90	'  Well suited	i	  Well suited	i
	i	i I	i	i I	İ
433729:	I	l	I	l	I
Sultz	85	Well suited	!	Well suited	!
433739:	!	l i	1	l İ	! !
Moquah	I 85	ı  Well suited	i	  Well suited	! !
	i	I	i	 	i
433771:	I	l	I	l	I
Beaches	97	Not rated	1	Not rated	1
433802:	!	 		 	!
Udorthents, ravines	<u> </u>	! 	<u> </u>	! 	! !
and escarpments		Not rated	i	Not rated	i
	I	l	I	l	I
452739:	1 100		!		!
Water	1 100	Not rated	1	Not rated	 
452765:	i	! 	İ	! 	
Abbaye	55	Well suited	i	Well suited	İ
	1	l	I	l	I
Lapoin	40	Well suited	!	Well suited	!
1383557:		 	 	 	! !
Au Gres	,   85	'  Unsuited	i	  Well suited	i
	i		11.00		İ
	I	l	I	l	I
1383580:	1 40	 	!		!
Loxley	40 			-	l  0.50
	i	l	1	l neemess	l
Beseman	30	Unsuited	i	Poorly suited	İ
	I	Wetness	1.00	Wetness	10.50
P	1	 	!		!
Dawson				Poorly suited   Wetness	I  0.50
	i	l	1	l neemess	l
1383581:	I	l	I	1	I
Rifle	90			Poorly suited	1
	l	Wetness	1.00	Wetness	0.50
1383603:	I I	 	1	 	I I
Cornucopia	80	Poorly suited	i	Poorly suited	İ
<del>-</del>	I	_		_	0.50
	1	!		Stickiness; high	
	1	]	•	plasticity index	I
	1	ı	1	l	ı

Table 6.-Land Management, Part III (Site Preparation)-Continued

		l Guitabilita fa			
		Suitability for   mechanical site	r n	Suitability fo	r
		preparation (de			
		Rating class and		<del></del>	
	unit	limiting features	ĺ	limiting features	İ
	ī	I	ı	l .	ī
1383658:	I	I	I	I	I
Deerton	50	Well suited	!	Well suited	!
Businstons	1 40	  Decmler continued	!	  Decmler contrad	!
Brownstone				Poorly suited   Rock fragments	10.50
	i	l Rock Fragments	1	l Rock Tragments	1
1383660:	i	i	i	i i	i
Deerton	50	Well suited	İ	Well suited	İ
	I	I	I	I	1
Brownstone	40			Poorly suited	I
	1	Rock fragments	10.50	Rock fragments	10.50
1303663	!	<u> </u>	!	  -	!
1383662: Abbaye	1 90	  Well suited	! !	  Well suited	!
ADDAYE	1	l	i	l	i
1383665:	i	i	i	i İ	i
Allendale	35	Unsuited	I	Well suited	I
	I	Wetness	1.00	I	1
		1	1	!	1
Wakeley				Poorly suited	10 50
	!	Wetness	11.00	Wetness	10.50
Kinross	1 20	l Unsuited	! !	  Well suited	1
MIMI 000			11.00	•	i
	i	İ	i	i İ	i
1383960:	I	I	I	I	I
Flink	75		•	Well suited	I
	1	Wetness	11.00	!	!
1444357:	!	  -	!	  -	!
Arnheim	I I 85	l Unsuited	! !	  Well suited	1
			11.00	•	i
	i	İ	İ	İ	i
1444359:	I	I	I	I	1
Beaches	97	Not rated	I	Not rated	I
1444267	!	1	!	<u> </u>	!
1444367: Udorthents, ravines	!	] 	!	 	!
and escarpments	•	lNot rated	<u> </u>	  Not rated	i
	i	l	i	l	i
1444378:	I	I	I	I	I
Wakefield	85	Well suited	I	Well suited	I
1444000	!	<u> </u>	!	<u> </u>	1
1444379: Wakefield		  Well swited	•	  Wall amitad	1
wakerreru	l 02	lweit saired	I I	Well suited 	1
1444388:	<u>'</u>		i	i I	i
Allendale	80	Unsuited	i	Well suited	i
	I	Wetness	1.00		I
	I	l	I	l	I
1444402:		<u> </u>	ļ .	<u> </u>	!
Tonkey	90		•	Well suited	1
	I I	Wetness	1.00	 	I
1444410:	i I	! 	i I	! 	i
Tula	80	Well suited	i	Poorly suited	i
	I	I	I	<del>-</del>	0.50
	l	I	I	I	I

Table 6.-Land Management, Part III (Site Preparation)-Continued

	l . – .	Suitability fo	r	Suitability for	r
Map unit symbol	Pct.	mechanical site	е .	mechanical site	е .
		preparation (de			
	-	Rating class and		-	
	lunic	limiting features	<u>!</u>	IIMICING Teacures	<del> </del>
1444414:	! !	! !	! !	I I	
Lupton	1 1 40	'  Unsuited	i	Poorly suited	i
•				-	0.50
	I	I	I	I	I
Cathro	30	•		Poorly suited	I
	!	Wetness	11.00	Wetness	10.50
Tawas	   2E	 	!	  Poorly suited	!
iawas	•	•		-	10.50
	i	l	1	l	1
1444425:	İ	İ	İ	i I	i
Lerch	50	Unsuited	I	Poorly suited	I
	I	Wetness		•	10.75
	!	!		Stickiness; high	
	l	! !	!	plasticity index	!
Herbster	I I 35	l Unsuited	! !	  Poorly suited	
	i	•		Stickiness; high	0.50
	ĺ	İ	İ	plasticity index	ĺ
	I	I	I	I	I
1444426:	!	<u> </u>	!	<u> </u>	!
Portwing				Poorly suited	10 50
	1	Wetness		Stickiness; high   plasticity index	
	<u> </u>	! 	! !	prasticity index	<u> </u>
Herbster	30	Unsuited	i	Poorly suited	i
	I	Wetness	11.00	Stickiness; high	0.50
	I	ļ.	1	plasticity index	1
1444427:	!		!		!
Cornucopia	I I 80	l  Well suited	! !	  Poorly suited	
COIMCOOPIG	1	l		Stickiness; high	10.50
	İ	İ	İ	plasticity index	
	I	I	I	I	I
1444428:		1	I	<u> </u>	1
Cornucopia	1 80	-		Poorly suited	10 50
	! !	Slope		Slope   Stickiness; high	10.50
	i	i i	i	plasticity index	
	i	i	i	 	i
1444431:	I	I	I	I	I
Croswell	82	Well suited	I	Well suited	I
1444420.	!	1	!	<u> </u>	!
1444432: Gogebic		  Wall suitad	! !	  Well suited	
GOGEDIC	1 03 1	Well Suited	! !	l	<u> </u>
1444435:	i	i İ	i	i I	i
Iosco	85	Unsuited	I	Well suited	I
	I	Wetness	1.00	I	I
1444457	!	<u> </u>	!	<u> </u>	!
1444457: Redrim	   05	  Well suited	 	  Boomly quited	
RedIIII	1 62	Well Sulted	! !	Poorly suited   Rock fragments	10.50
	i		i		1
1444459:	I	I	I	I	I
Zeba	90	Well suited	I	Well suited	I
	!	!	I	<u> </u>	I
1444460:		  Well emited	I	  Well emited	I
Abbaye	55 	well saitea	I I	Well suited	
Lapoin	   40	  Well suited		  Well suited	<u> </u>
<u>.</u>			İ	<del></del>	i

Table 6.-Land Management, Part III (Site Preparation)-Continued

		Suitability fo	r	Suitability fo   mechanical sit	r
				preparation (surf	
		· —		Rating class and	<del></del>
	_	limiting features		limiting features	
	ı	I	Ī	I	ī
1444461:	I	I	1	I	1
Abbaye	55	Well suited	!	Well suited	1
Zeba	1 40	  Well swited	!	  Well suited	1
ZeDa	1 <del>1</del> 0	Well Suited	<u> </u>	Well Suited	<u> </u>
1444477:	i	i	i	i	i
Cublake	35	Well suited	1	Well suited	1
	1	I	1	I	1
Croswell	20	Well suited	!	Well suited	!
Ashwabay	1 20	  Well suited	!	  Well suited	!
Ashwabay	1 20 1	Well Suited	i	Well Suited	i
1444478:	i	i	i	i	i
Cublake	35	Well suited	I	Well suited	1
		1	1	1	1
Croswell	20	Well suited	!	Well suited	!
Ashwabay	1 20	  Well suited		  Well suited	1
nonwasay	1	I	i	I	i
1444479:	i	İ	i	İ	i
Morganlake	85	Well suited	1	Well suited	1
	I	!	1	ļ.	1
1444480: Morganlake	   0E	  Well swited	!	  Mall anibad	1
Morganiake	1 65	Well Suited		Well suited	!
1444481:	i	i	i	i	i
Kellogg	35	Well suited	1	Well suited	1
		<u> </u>	1		1
Allendale				Well suited	!
		Wetness	11.00	1	!
Ashwabay	20	  Well suited	i	Well suited	i
_	I	I	I	I	1
1444482:	1	I	1	I	1
Kellogg	40	Well suited	!	Well suited	!
Allendale	l l 25	l Novi ted	1	  Well suited	1
nii i i i i i i i i i i i i i i i i i i	1		11.00		i
	ĺ	Ì	İ	İ	İ
Ashwabay	20	Well suited	1	Well suited	1
1444406.	!		!		!
1444486: Sedgwick	I I 50	  Well suited	1	  Well suited	1
=	30 	 		surceu	i
Munuscong		Unsuited		Well suited	i
	I	Wetness	1.00	I	1
1444405	!	!	1	<u> </u>	!
1444487: Superior	   50	  Well suited	1	  Well suited	1
Superior	, Ju		i		i
Sedgwick	30	Well suited	i	  Well suited	i
	I	I	1	I	1
1444488:			!		!
Superior	50	Well suited	I	Well suited	I
Sedgwick	1 30	  Well suited	i	  Well suited	
- 3 <del>-9</del>	. Ju		i		i

Table 6.-Land Management, Part III (Site Preparation)-Continued

Map unit symbol		Suitability fo   mechanical sit   preparation (de	r e	Suitability fo   mechanical sit	r e
and soil name	of	preparation (de	ep)	preparation (surf	ace)
		Rating class and			
	unit	limiting features	1	limiting features	l
1444489: Sultz		- <u>-</u>		    Poorly suited   Slope	      0.50
Ashwabay	   25 			  Poorly suited   Slope	    0.50
Rubicon		- <u>-</u>		  Poorly suited   Slope 	    0.50
1444492: Manistee		- <u>-</u>		  -  Poorly suited   Slope	      0.50
Kellogg	30   	=		  Poorly suited   Slope	    0.50
Ashwabay	_			  Poorly suited   Slope	    0.50
1444506: Keweenaw	     60	    Well suited	,   	    Well suited	,   
Rubicon	1   30 	  Well suited 	 	  Well suited 	 
1444507: Keweenaw	   60 	  Well suited 	   	  Well suited 	   
Rubicon	30 	  Well suited 	 	  Well suited 	 
1444585: Meehan, beaches	   90 		    1.00	  Well suited   	     
1444586: Wurtsmith, beaches	   90 		    1.00	  Well suited   	     
1444587: Grayling, beaches	   95 	  Well suited 	   	  Well suited 	   
1529830: Meehan, beaches	   90 		    1.00	  Well suited   	     
1700372: Loxley	   40 			  -  Poorly suited   Wetness	      0.50
Beseman	1   30 	•		  Poorly suited   Wetness	    0.50
Dawson	1   28   	•		  Poorly suited   Wetness 	I    0.50
1700373: Rifle	   90 	•		    Poorly suited   Wetness 	      0.50 

Table 6.-Land Management, Part III (Site Preparation)-Continued

	ı	Suitability fo	r	Suitability fo	r
	Pct.			mechanical sit	
and soil name	of	preparation (de	ep)	preparation (surf	ace)
	map	Rating class and	Value	Rating class and	Value
	unit	limiting features	1	limiting features	1
	1	I	1	I	I
1700374:	I	I	1	I	1
Allendale	35	Unsuited	1	Well suited	1
	I	Wetness	1.00	l	1
	I	I	1	l	1
Wakeley	30	•		Poorly suited	1
	1	Wetness	1.00	Wetness	0.50
	I	I	I	I	I
Kinross	20	• • • • • • • • • • • • • • • • • • • •	•	Well suited	I
	I	Wetness	1.00	I	I
	1	!	1	<u> </u>	!
1702605:		!	!	!	!
Menominee	85			Poorly suited	
	!	Slope	10.50	Slope	10.50
1702606:	!	! :	!	] 	!
Deerton	I 50	l  Woll quited	!	  Well suited	!
Deer con	1 30	Well Suited		Well Sulted	!
Brownstone	1 1 40	l  Poorly suited	<u> </u>	  Poorly suited	:
DIOWIIS COILE	1 -20		10.50		10.50
	i	l	1	l	1
1702607:	i	i i	i	i I	i
Deerton	I 50	Well suited	i	Well suited	i
	i	İ	i	I	i
Brownstone	40	Poorly suited	İ	Poorly suited	İ
	I	Rock fragments	10.50	Rock fragments	10.50
	I	I	I	I	I
1702608:	I	I	1	I	I
Abbaye	90	Well suited	1	Well suited	1
	I	I	I	I	I
1711685:	I	I	I	I	I
Cublake	50	Well suited	I	Well suited	I
	1	I	I	I	I
Keweenaw	30	Well suited	I	Well suited	I
	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Table 6.-Land Management, Part IV (Site Restoration)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

		 I			
		Potential for dama	-		ling
and soil name		soil by fire		<del></del>	
		Rating class and   limiting features			
	1		<del>'</del>	l TIME OF 19 TOUCHED	<del></del>
433292:	i	İ	i		i
Lerch	50	Low	I	High	I
	1	<u> </u>	1	Wetness	11.00
Herbster	25		!	  High	!
neibster	1 33	I TOW	i	Wetness	11.00
	i	İ	i		i
433296:	1	I	I		I
Cublake		-	•	Low	1
	!	Texture/surface	11.00		!
	i	layer   thickness/rock			<u> </u>
	i	fragments	i		i
	1	I	I		I
Croswell	20	Low	<u> </u>	Low	1
Ashwabay	I I 20	l IT.ow	 	  Low	1
11511waba ş	1		i		i
433299:	i	İ	İ		i
Cublake	35		•	Low	1
	!	Texture/surface	1.00		!
	<u> </u>	layer   thickness/rock	<u> </u>		
	i	fragments	i		i
	Ι	l	I		I
Croswell	20	Low	!	Low	!
Ashwabay	I I 20	l IT.ow	 	  Low	
IISIIwaza y	1		i		i
433300:	I	I	I		I
Kellogg			•	Moderate	
	!	Texture/surface	11.00	Wetness	10.50
	i	layer   thickness/rock			<u> </u>
	i	fragments	i		i
	L	I	I		I
Allendale	25	Low	ļ.	High	
	I I	 	 	Wetness	11.00
Ashwabay	20	Low	i	Low	i
-	İ	İ	İ		İ
433301:		l	ļ.	<u> </u>	!
Kellogg	40	High   Texture/surface	•	Moderate   Wetness	  0.50
	<u> </u>	layer	11.00	wethess	10.50
	i	thickness/rock	i		i
	I	fragments	I	l	I
		17.	1		!
Allendale	25 	I TOM	I I	High   Wetness	  1.00
	<u> </u>	' 	<u> </u>	Hermess	1
Ashwabay	20	Low	į	Low	i
	I	I	I		I

Table 6.—Land Management, Part IV (Site Restoration)—Continued

		   Potential for dama   soil by fire			ling
		Rating class and			Value
	unit	limiting features	<u>!</u>	limiting features	<del>!</del>
433304:	 	 	l I	 	1
Sedgwick	50	Low	i İ	High	i
	l	<u> </u>	ļ .	Wetness	11.00
Munuscong	   30 	  Low 	   	  High   Wetness	    1.00
433305:	 	 	! !	 	<u> </u>
Superior	50 	Low 	 	High   Wetness	  1.00
Sedgwick		  Moderate   Texture/rock   fragments		  High   Wetness 	    1.00
433309:	İ	! 	İ	! 	i
Superior	50 	Low	 	High   Wetness	  1.00
Sedgwick		  Moderate   Texture/rock		  High   Wetness	    1.00
	l	fragments	l		1
433310:	 	 	l I	 	1
Sultz		Texture/slope/	11.00	Low     	     
Ashwabay	   25 	  Low	   	  Low	 
Rubicon		Texture/slope/	11.00	Low	 
433314:	 	 	! 		<u> </u>
Manistee	l	Texture/slope/	11.00	Low     	
Kellogg	   30       	=	    1.00     	  Moderate   Wetness   	    0.50   
Ashwabay	   20     	  High   Texture/slope/   surface layer   thickness	    1.00   	  Low 	       
433326:	 	! 	' 	! 	
Rubicon	85       	High   Texture/surface   layer   thickness/rock   fragments	  1.00     	Low     	       

Table 6.—Land Management, Part IV (Site Restoration)—Continued

	ı	<u> </u>		<u> </u>		
		Potential for damage to     soil by fire		mortality		
	_	Rating class and limiting features		<del>-</del>		
	I		<u>'</u> 		<del>'</del>	
433379: Allendale		  Tow		  High	!	
Allendale	80 	   TOW	! 	=	1	
100515	Į.	  -	l	!	!	
433515: Lupton	I I 40	  Low	 	  High		
_up 00		 		=	11.00	
Cathur			ļ.	   Tri = h	!	
Cathro	30 	  TOM	! !	High   Wetness	11.00	
	i .	i I	İ	İ	İ	
Tawas	25 	Low	1	High   Wetness	  1.00	
	i	' 	i		1	
433572:		 	!	 	!	
Portwing	50 	I TOM	! !	Moderate   Wetness	I 10.50	
	i	İ	i	İ	i	
Herbster	30	Low	I	High   Wetness	  1.00	
	 	! 	! 	wechess	I	
433573:		<u> </u>	ļ	<u> </u>	ļ.	
Cornucopia	1 80 1	Low	 	Low 		
433582:	i	İ	i	İ	i	
Croswell	82	Low	l	Low		
433599:	i	! 	! 	! 	i	
Annalake	85	Low	!	Low	!	
433600:	l I	l 1	! !	 	<u> </u>	
Annalake	80	Low	İ	Low	İ	
433671:		 	 	 	1	
Arnheim	85	Low	İ	  High	i	
	1	<u> </u>	!	Wetness	11.00	
433676:	l I	 	 	I I	<u> </u>	
Redrim	85		•	Low	İ	
	 	Texture/rock   fragments	1.00 	 		
	i			i İ	i	
433679:			ļ.	  Madamata	!	
Lapoin	85 	  TOM	! !	Moderate   Wetness	10.50	
	i	i I	İ	İ	İ	
433686: Zeba	   90	  T.ow	 	  High		
Debu	1		i		1.00	
433729:		  -		<u> </u>		
Sultz	I   85	I  High	! !	  Low	<u> </u>	
	l		11.00	!	ļ.	
	 	layer   thickness/rock	 	 		
	i	fragments	i	i	i	
422720.		  -		<u> </u>		
433739: Moquah	I   85	I  Low	! 	  Low		
<del>-</del>		i I		İ	I	

Table 6.-Land Management, Part IV (Site Restoration)-Continued

		   Potential for dama  soil by fire			ling
		Rating class and			Value
	unit	limiting features	<u> </u>	limiting features	<u> </u>
433771: Beaches	     97	    Not rated	   	    Not rated	 
433802: Udorthents, ravines		 	! ! !	 	 
and escarpments	83   	Not rated   	! ! !	Not rated   	
Water	100 	Not rated 	 	Not rated 	i I
452765: Abbaye	   55 	  Low 	•	  Moderate   Wetness	    0.50
Lapoin	   40 	  Low 	•	  Moderate   Wetness 	    0.50
1383557: Au Gres	l I	Texture/surface		  High   Wetness   	    1.00     
1383580: Loxley	     40 	  Low 		•	      1.00  0.50
Beseman	   30   	  Low 			    1.00  0.50
Dawson	   28     	  Low   	ĺ	•	  1.00  0.50
1383581: Rifle	   90 	  Low 	•	  High   Wetness 	    1.00
1383603: Cornucopia		  Low 	   	  Low 	 
1383658: Deerton	   50	  High   Texture/rock	    1.00	  Low   	
Brownstone		Texture/rock	    1.00 	  Low 	     
1383660: Deerton	İ	-	      1.00 	  Low	       
	l I	· •	1.00 	  Low   	       

Table 6.—Land Management, Part IV (Site Restoration)—Continued

		   Potential for dama   soil by fire	_		ling
	_	Rating class and limiting features		_	
1383662: Abbaye	l I	   	l I	  -  Moderate   Wetness	      0.50
1383665: Allendale	     35 	    Low 		    High   Wetness	1   1   1   1   1   1   1   1   1   1
Wakeley	İ		11.00	  High   Wetness   Soil reaction	  1.00  0.50
Kinross	   20         	Texture/surface	11.00		  1.00  0.50 
1383960: Flink	     75   	 	       	    Moderate   Wetness 	      0.50
1444357: Arnheim	   85   	  Low 	     	  High   Wetness 	    1.00
1444359: Beaches	   97 	  Not rated 	 	  Not rated 	 
1444367: Udorthents, ravines and escarpments		    Not rated 	     	    Not rated 	 
1444378: Wakefield	   85   	  Low   	     	  High   Wetness 	    1.00 
1444379: Wakefield	   85   	  Low 	     	  High   Wetness 	    1.00
1444388: Allendale	   80   	  Low 	     	  High   Wetness 	    1.00
1444402: Tonkey	   90   	  Low 	     	  High   Wetness 	    1.00
1444410: Tula	   80 	  Low 	 	  High   Wetness 	    1.00
1444414: Lupton	   40 	  Low 	     	  High   Wetness 	    1.00
Cathro	30 	Low 		  High   Wetness 	  1.00
Tawas	İ	Low   		  High   Wetness 	  1.00

Table 6.—Land Management, Part IV (Site Restoration)—Continued

		   Potential for damad  soil by fire	-		ling
	_	Rating class and limiting features		=	
1444425: Lerch	l I	 I I	   	      High	        1.00
Herbster	   35 	  Low 	   	  High   Wetness	    1.00
1444426: Portwing	     50 	  -  Low  -	       	  Moderate   Wetness	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Herbster	I   30   	  Low 	     	  High   Wetness 	    1.00
1444427: Cornucopia	   80 	  Low 	   	  Low 	   
1444428: Cornucopia	   80 	  Low 	   	  Low 	 
1444431: Croswell	   82 	  Low 	   	  Low 	 
1444432: Gogebic	   85   	  Low 	     	  High   Wetness 	    1.00
1444435: Iosco	   85   	•		  High   Wetness	    1.00
1444457: Redrim		· •	      1.00 	  Low	!       
1444459: Zeba	   90 	  Low  L	     	  High   Wetness	      1.00
1444460: Abbaye	   55 	  Low 	:       	  Moderate   Wetness	      0.50
Lapoin	   40 	  Low 	     	  Moderate   Wetness 	    0.50
1444461: Abbaye	   55 	  Low 	     	  Moderate   Wetness	      0.50
Zeba	   40 	  Low   	     	  High   Wetness 	    1.00
1444477: Cublake	 	Texture/surface layer thickness/rock fragments	    1.00       	   Low       	 

Table 6.-Land Management, Part IV (Site Restoration)-Continued

		Potential for damage to     soil by fire		mortality		
	_	Rating class and limiting features		Rating class and   limiting features		
	I		<u> </u> 		<u> </u>	
1444477: Croswell	   20	  Low		  Low		
Ashwabay	I   20 	  Low 	 	  Low 		
1444478: Cublake	35       	  High   Texture/surface   layer   thickness/rock   fragments	•	   Low     		
Croswell	   20 	  Low 	 	  Low 		
Ashwabay	1   20 	I  Low 	 	I  Low 	<u> </u>	
1444479: Morganlake	85       	  High   Texture/surface   layer   thickness/rock   fragments	•	   Low     		
1444480: Morganlake	   85       	  High   Texture/surface   layer   thickness/rock   fragments	•	 	 	
1444481:	! 	 	 	 		
Kellogg	35       	High   Texture/surface   layer   thickness/rock   fragments	•	Moderate   Wetness     	  0.50   	
Allendale	   25 	  Low 		  High   Wetness	1   1.00	
Ashwabay	   20 	  Low 	 	  Low 	 	
1444482: Kellogg	   40       	  High   Texture/surface   layer   thickness/rock   fragments		  Moderate   Wetness   	      0.50   	
Allendale	l   25 	  Low 	 	  High   Wetness	    1.00	
Ashwabay	   20	  Low	 	  Low	 	
1444486: Sedgwick	     50	  Low 	     	    High   Wetness	1   1   1   1   1   1   1   1   1   1	
Munuscong	   30 	  Low 	 	  High   Wetness		

Table 6.-Land Management, Part IV (Site Restoration)-Continued

		Potential for dama soil by fire			lling
		Rating class and			Value
		limiting features			
	I	I	I	l	1
1444487:	!	<u> </u>	1	<u> </u>	1
Superior	50	Low	!	High	
	!	!	!	Wetness	1.00
Sedgwick	1 30	  Moderate		ı  High	!
beagnies	•	•		•	1.00
	i	fragments			i
	I	I	1	l	1
1444488:	!	<u> </u>	!		1
Superior	50	Low	!	High	1 00
	!	 	!	Wetness	11.00
Sedgwick	1 30	ı  Moderate	<u> </u>	ı  High	<u> </u>
<b>-</b>				Wetness	11.00
	i	fragments	i		i
	I	I	1	l	1
1444489:		<u> </u>	!	<u> </u>	!
Sultz	35	• •		Low	!
	!	Texture/slope/   surface layer	1.00 	I I	!
	i	thickness	i	! 	i .
	i		i	i I	i
Ashwabay	25	Low	1	Low	1
	1	I	1	l	1
Rubicon		• •	•	Low	!
	!	Texture/slope/   surface layer	1.00 	] 	!
	i	thickness	<u> </u>	! 	<u> </u>
	i	l	i		i
1444492:	İ	İ	Ì	l	İ
Manistee	40	=	1	Low	1
	1	•	11.00	<u> </u>	
	!	surface layer	!	 	!
	!	thickness		 	!
Kellogg	1 30	  High	i	  Moderate	i
33		Texture/surface			0.50
	I	layer	1	l	1
	1	thickness/rock	1		1
	!	fragments	!		!
Ashwabay	1 20	  High	!	  Low	!
ASIIWADAY	1 20	Texture/slope/			i .
	i	surface layer		i İ	i
	İ	thickness	Ì	l	İ
	I	l	I	l	I
1444506:			!	  -	!
Keweenaw	1 60	ніgn   Texture/surface	  1.00	Low	!
	:	layer	1	I I	<u> </u>
	i	thickness/rock	i	i I	i
	i	fragments	i	i İ	i
	Ι	l	1	l	I
Rubicon	30	=	•	Low	1
	1	Texture/surface	1.00 	] 	1
	! 	layer   thickness/rock	<u> </u>	! 	
	i	fragments	i		i
			i		

Table 6.-Land Management, Part IV (Site Restoration)-Continued

		Potential for dama   soil by fire	_		ling
	map	Rating class and	Value	Rating class and	Value
·	unit	limiting features	<u> </u>	limiting features	<u> </u>
1444507:		 	!	<u> </u>	!
Keweenaw	1 60	ı  High	i	  Low	i
	i		11.00	İ	i
	!	layer	!	!	1
		thickness/rock   fragments		 	1
	i	ITAGMENTS	i .	! 	i
Rubicon	30	  High	İ	Low	i
	!		11.00	<u> </u>	!
	!	layer   thickness/rock	!	 	!
	i	fragments	i .	! 	i
	i	 	i	İ	i
1444585:		<u> </u>	1	<u> </u>	1
Meehan, beaches	90	High   Texture/surface		High   Wetness	  1.00
	! !	layer	11.00	wethess	11.00
	i	thickness/rock	i	I	i
	1	fragments	I	l	I
1444586:			!		!
Wurtsmith, beaches	I I 90	ι  Hiαh	<u> </u>	  Low	<u> </u>
	i	· -	1.00	i	i
		layer	1	!	1
		thickness/rock	!		!
	<u> </u>	fragments 	<u> </u>	! 	<u> </u>
1444587:	i	İ	i	İ	i
Grayling, beaches	95	Low	!	Low	1
1529830:		l I	!	 	!
Meehan, beaches	90	  High	i	  High	i
	I	Texture/surface	11.00	Wetness	11.00
	!	layer	!	<u> </u>	!
		thickness/rock   fragments		 	1
	i		i		i
1700372:	l	I	I	l	I
Loxley	40	Low	!	High   Wetness	11 00
	! !	! 	<u> </u>	Wethess   Soil reaction	1.00  0.50
	i	i İ	i	i	İ
Beseman	30	Low		High	
		 	!		1.00  0.50
	<u> </u>	! 	<u> </u>	SOII TEACTION	10.50 I
Dawson	28	Low	i	High	i
		!	1		11.00
		 		Soil reaction	10.50
1700373:	<u> </u>	' 	i		i
Rifle	90	Low	I	  High	I
			!	Wetness	11.00
1700374:		1 	1	I I	I
Allendale	35	Low	i	  High	i
	I	I	I	Wetness	11.00
Waltalan	20	   Ui ab	!	   Ui ab	!
Wakeley	1 30 1			High   Wetness	  1.00
	i	fragments	1		10.50
	I	I	İ	İ	İ

Table 6.-Land Management, Part IV (Site Restoration)-Continued

Map unit symbol		Potential for dama	_		lling
and soil name		soil by fire			
		Rating class and   limiting features			
	Ī	<u> </u>	Ī	!	Ī
1700374:	1		!	 	!
Kinross	1 20	High   Texture/surface		High   Wetness	11.00
	i	layer	1	Soil reaction	10.50
	i	thickness/rock	i	l	1
	i	fragments	i	i	i
1702605:	1	 	1	 	1
Menominee	85	'  High	i	'  Low	i
		Texture/surface	11.00	, - 	i
	1	layer	1	l	1
	1	thickness/rock	1	I	1
	1	fragments	1	  -	1
1702606:	i	 	i	 	i
Deerton	50	•	•	Low	1
	1		1.00	I	I
		fragments		 	
Brownstone	40	'  High	i	  Low	i
	1	Texture/rock	1.00	I	1
	1	fragments	!	<u> </u>	1
1702607:	1	 	1	l I	1
Deerton	50	High	i	Low	i
	1	Texture/rock	1.00	l	1
	1	fragments	1		!
Brownstone	40	  High	<u> </u>	  Low	i
	Ì	Texture/rock	11.00	l	İ
	!	fragments	!	  -	!
1702608:	1	 		 	i
Abbaye	90	Low	i	Moderate	i
	!	<u> </u>	1	Wetness	10.50
1711685:	1	 	1	 	1
Cublake	50	High	i	Low	i
	Ì		11.00	l	İ
	1	layer	1	I	1
	1	thickness/rock	1	I	1
	1	fragments	I	 	1
Keweenaw	30	।  High	i	  Low	
	i	Texture/surface	•	•	İ
	I	layer	1	I	I
	1	thickness/rock	1	l	1
	1	fragments	1	I	1

Table 7.—Recreation, Part I (Camp and Picnic Areas)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct.   of	•		Picnic areas	
	map	Rating class and		_	
	lunit	limiting features	<u>!</u>	limiting features	<u>!</u>
	!	!	!	!	1
433292:		l	!	l	!
Lerch	·   50	Very limited		Very limited	1 00
	!	Depth to	1.00 		1.00
	1	saturated zone   Ponding		Ponding   Depth to	1.00  1.00
	i	,		saturated zone	
	i			Slow water	11.00
	i	movement		movement	i
	i	İ	i	İ	i
Herbster	35	Very limited	İ	Very limited	İ
	1	Depth to	1.00	Depth to	11.00
	1	saturated zone	1	saturated zone	1
	1	Slow water	11.00	Slow water	11.00
	1	movement	1	movement	1
	1	I	1	I	1
433296:		1	1	1	1
Cublake	. 35	=		Very limited	
	!	·		Too sandy	1.00
	!	Depth to		Depth to	0.19
	1	saturated zone		saturated zone	1
Croswell	.I 20	  Very limited		  Very limited	i
CIOSWEII	1 20			Too sandy	11.00
	i	Depth to		Depth to	10.19
	i	saturated zone		saturated zone	•
	i	İ	i	İ	i
Ashwabay	20	Somewhat limited	1	Somewhat limited	1
	1	Too sandy	0.87	Too sandy	10.87
	1	I	1	I	1
433299:	1	I	1	I	1
Cublake	. 35	_		Very limited	
	!	Too sandy		Too sandy	11.00
	!	Depth to		Slope	10.37
	1	saturated zone		Depth to   saturated zone	0.19
	1	Slope	10.37	Sacurated zone	1
Croswell	. 20	ı  Verv limited	i	  Very limited	i
0_000	i	Too sandy		Too sandy	11.00
	i	Depth to	•	Depth to	0.19
	İ	saturated zone	İ	saturated zone	İ
	1	Slope	0.04	Slope	10.04
	1	I	1	I	1
Ashwabay	20	Somewhat limited	1	Somewhat limited	1
	1	Too sandy	0.87		0.87
	1	Depth to	10.39	•	10.37
	!	saturated zone		Depth to	0.19
	!	Slope	10.37	saturated zone	!
433300:	1	] 	1	] 	1
Kellogg	.   35	  Very limited	1	  Very limited	i
	, ,,,	Too sandy	11.00	=	11.00
	i	100 sandy   Slow water	10.99	_	10.99
	i	movement	1	movement	1
	i	Depth to	0.98	•	0.75
	ĺ	saturated zone	i	saturated zone	i
	1	1	i	I	i

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	  Pct.   of	•		 	
		Rating class and limiting features		Rating class and   limiting features	
433300:			1		1
Allendale	   25 	  Very limited   Depth to	    1.00	  Very limited   Depth to	    1.00
	l	saturated zone   Slow water	  1.00	saturated zone   Slow water	  1.00
	! 	movement	1.00	movement	11.00
	ļ.	Too sandy	10.37	Too sandy	10.37
Ashwabay	   20	  Somewhat limited	•	  Somewhat limited	
	 	Too sandy 	0.87 	Too sandy 	0.87 
433301:	i	i I	i		i
Kellogg	40	Very limited		Very limited	
	 	Too sandy   Slow water	11.00	Too sandy   Slow water	1.00  0.99
	İ	movement	:	movement	1
	ĺ	Depth to	0.98	Depth to	0.75
		saturated zone	  0.37	saturated zone   Slope	I 10.37
	! 	Slope 	10.37	   grobe	10.37
Allendale	25	Very limited	i	  Very limited	i
	!	Depth to		Depth to	11.00
	 	saturated zone   Slow water	  1.00	saturated zone   Slow water	  1.00
	İ	movement	1	movement	1
	ĺ	Too sandy	10.37	Too sandy	10.37
		Slope	10.04	Slope	10.04
Ashwabay	20	  Somewhat limited	i	  Somewhat limited	i
	!	Too sandy	10.87	· •	10.87
	 	Slope	0.37 	Slope 	0.37 
433304:	i	İ	i	İ	i
Sedgwick	50	Very limited		Very limited	
	 	Depth to   saturated zone	11.00 I	Depth to   saturated zone	1.00 
	i	Slow water	0.99	•	0.99
	!	movement		movement	1
	 	Dusty 	0.01 	Dusty 	0.01 
Munuscong	30	Very limited	i	Very limited	i
	!	Depth to	•	Ponding	1.00
	 	saturated zone   Ponding	  1.00	Depth to   saturated zone	1.00 
	İ	Slow water	10.96		0.96
	I	movement	1	movement	I
	 	Dusty 	0.01 	Dusty 	10.01
433305:	I	i I	i		i
Superior	50	Very limited		Very limited	
	l I	Depth to   saturated zone	11.00	Depth to   saturated zone	11.00
		Slow water	1		  1.00
	I	movement	Ī	movement	İ
		Dusty	0.01	Dusty	10.01

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct.   of	i		   Picnic areas 	
	-	Rating class and limiting features		•	
433305:	 	 	 	 	1
Sedgwick	-  30	Very limited	1	Very limited	1
	1	Depth to	1.00	Depth to	1.00
	1	saturated zone	1	saturated zone	1
	1	•	0.99	Slow water	10.99
	1	movement	1	movement	1
	1	•		Too sandy	10.70
	!	Dusty	0.01	Dusty	0.01
433309:		 		l I	
Superior	-1 50	  Very limited	i	  Very limited	<u> </u>
Duperior		Depth to		Depth to	11.00
	i	saturated zone	1	saturated zone	1
	i	Slow water		Slow water	11.00
	i	movement	i	movement	i
	İ	Slope	0.37	Slope	10.37
	Ì	Dusty	0.01	Dusty	0.01
	1	I	1	l	1
Sedgwick	-  30	•	•	Very limited	1
	1	•	1.00	Depth to	1.00
	1	saturated zone		saturated zone	
	!	Slow water	:	Slow water	10.99
	!	movement	1 70	movement	1 70
	!	Too sandy		Too sandy	10.70
		Dusty	0.01	Dusty 	0.01
433310:	i	! !	i	! 	i
	- i 35	  Very limited	i	Very limited	i
		_	11.00	•	11.00
	Ì	Too sandy	11.00	Slope	11.00
	1	I	1	I	1
Ashwabay	-  25	Very limited	1	Very limited	1
	1	•	1.00	•	11.00
	!	Too sandy	0.87	Too sandy	10.87
Polici a a a	1	 	 		!
Rubicon	-1 20	Very limited   Slope		Very limited   Too sandy	  1.00
	-	Slope   Too sandy	•	Slope	11.00
	i	l 100 banay	1	l Siope	1
433314:	i	i	i	i i	i
Manistee	-  40	Very limited	İ	Very limited	İ
	1	Slope	1.00	Too sandy	1.00
	1	Slow water	1.00	Slope	1.00
	1	movement	1	Slow water	1.00
		Too sandy	11.00	movement	1
	1	<u> </u>	!	l	!
Kellogg	-  30	Very limited		Very limited	1
	!	Slope	1.00	· -	11.00
	!	Too sandy   Slow water	1.00  0.99	•	1.00  0.99
	-	Slow water   movement	10.99	movement	10.99
	;	Depth to	0.98	•	10.75
	i	saturated zone	1	saturated zone	10.75
	i		i		í
Ashwabay	-   20	Very limited	I	Very limited	1
	1	Slope	11.00	_	11.00
	1	Too sandy	0.87	Too sandy	0.87
	I	l	1	l	1
433326:		<u> </u>	1	<u> </u>	1
U11D1 COD	-ı 85	Very limited	1	Very limited	1
Rubicon	""	Too sandy	11.00	_	11.00

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	  Pct.   of	•		   Picnic areas 	
	map  unit	Rating class and limiting features		Rating class and   limiting features	
433379:	l I	 	 	 	 
Allendale	80	Very limited	İ	Very limited	İ
	I	Depth to	1.00	Depth to	1.00
	I	saturated zone	1	saturated zone	1
	1	Slow water	1.00	•	1.00
	!	movement	10 27	movement	
	 	Too sandy 	0.37 	Too sandy 	0.37 
433515:	i	İ	i	İ	i
Lupton	40	Very limited		Very limited	1
	I	Depth to	1.00	•	11.00
	!	saturated zone		Depth to	11.00
	!	Ponding	1.00	•	
	!	Organic matter	1.00		1.00
	!	content   Dusty	  0.01	content   Dusty	  0.01
	<u> </u>	Dusty 	I	Dusty 	10.01
Cathro	30	Very limited	i	Very limited	i
	I	Depth to	1.00	Ponding	1.00
	I	saturated zone	1	Depth to	1.00
	1	Ponding	1.00	•	1
	1	Organic matter	11.00	_	11.00
	!	content		content	
		Dusty 	10.01	Dusty 	10.01
Tawas	25	  Very limited	i	  Very limited	i
	I	Depth to	1.00	Ponding	1.00
	I	saturated zone	1	Depth to	1.00
	I	Ponding	1.00	•	1
	I	Organic matter	1.00	=	1.00
	!	content		content	
	 	Dusty 	10.01	Dusty 	10.01
433572:	i	i I	i	i I	i
Portwing	50	Very limited	1	Very limited	1
	I	Depth to	1.00	Depth to	1.00
	I	saturated zone	1	saturated zone	1
	!	Slow water	10.96	•	10.96
		movement	!	movement	!
Herbster	30	  Very limited	i	  Very limited	i
	ĺ	Depth to	11.00	Depth to	11.00
	I	saturated zone	1	saturated zone	1
	I	Slow water	1.00	Slow water	1.00
	!	movement	!	movement	1
433573:	<u> </u>	! 	<u> </u>	! 	<u> </u>
Cornucopia	I 80	Somewhat limited	i	  Somewhat limited	i
-	i	Slow water	0.96	Slow water	0.96
	I	movement	1	movement	1
	!	Slope	10.37	Slope	10.37
433582:	 	] 		 	
Croswell	l 82	  Verv limited	i	  Very limited	i
		•	11.00	=	1.00
	i	Depth to		Depth to	0.19
	İ	saturated zone	i	saturated zone	i
	!	!	!	!	1
433599: Annalake	   0F	  Not limited	I	  Not limited	1
Annatake	•	Not limited	1	Not limited	1
		ı	•	1	•

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct.  Of	· •		 	
	_	Rating class and limiting features		Rating class and   limiting features	
433600:		 		 	 
Annalake	00   	•	  0.37 	Somewhat limited   Slope 	10.37
433671: Arnheim	   85	  Very limited	i I	  Very limited	į
		Depth to   saturated zone   Flooding   Ponding	1.00 	Ponding   Depth to   saturated zone   Flooding	1.00  1.00    0.40  0.01
433676:		Duscy   		Buscy   	
Redrim	85         	Too sandy Depth to bedrock	11.00	Depth to bedrock	  1.00  1.00  0.50
433679: Lapoin	   85 	    Somewhat limited   Depth to		  Somewhat limited   Slow water	      0.96
	 	saturated zone	    0.96 	movement Depth to saturated zone	  0.75
433686: Zeba	   90       	saturated zone Large stones content	1.00 	saturated zone Large stones content	  1.00    0.50 
433729: Sultz	     85 	·	      1.00	    Very limited   Too sandy	      1.00
433739: Moquah	   85   	Dusty	      1.00  0.01  0.01	Dusty	      0.40  0.01  0.01
433771: Beaches	     97	    Not rated	 	    Not rated	 
433802: Udorthents, ravines and escarpments		      Not rated	     	      Not rated	     
452739: Water	     100	    Not rated	 	    Not rated	
452765: Abbaye	   55       	Depth to   saturated zone   Too sandy	0.98	saturated zone	      0.75    0.70

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct.  of	· •		 	
	map	Rating class and limiting features		Rating class and limiting features	
452765:		 	 	 	1
Lapoin	40	Somewhat limited	İ	Somewhat limited	İ
	I	Depth to	0.98	Slow water	10.96
	!	saturated zone	•	movement	
		Slow water   movement	10.96 I	Depth to   saturated zone	0.75 
1383557:		 	 	 	1
Au Gres	85	Very limited	1	Very limited	1
	I	Depth to	1.00	Depth to	1.00
	 	saturated zone   Too sandy	I  0.50	saturated zone   Too sandy	  0.50
1383580:	į	 	į	 	į
	1 40	  Very limited	i	  Very limited	;
Louis		Depth to		Ponding	11.00
	i	saturated zone		Depth to	11.00
	1	Ponding	1.00	saturated zone	1
	1			Organic matter	11.00
	!	content   Dusty	I IO 01	content   Dusty	  0.01
	i	Dusty 	10.01	Dusty 	10.01
Beseman	30	Very limited	İ	Very limited	Ì
	1	·		Ponding	11.00
	!	saturated zone		Depth to	11.00
	!	Ponding   Organic matter		saturated zone   Organic matter	  1.00
	i	content	1	content	1
	i	Slow water	0.22	•	0.22
		movement		movement	1
Dawson	28	  Very limited	i	  Very limited	i
	1	Depth to	1.00	Ponding	11.00
	!	saturated zone	•	Depth to	11.00
		Ponding   Dusty	10.01	saturated zone   Dusty	  0.01
	i	l	1	l	1
1383581: Rifle	1 90	  Very limited	1	  Very limited	
KILLE	1	Depth to		Ponding	11.00
	i	saturated zone	•	Depth to	11.00
	I	Ponding	•	saturated zone	1
	 	Dusty 	0.01 	Dusty 	0.01 
1383603:	i	i I	i	i	i
Cornucopia	80	·		Very limited	11 00
		Slope   Slow water	1.00  0.96	·	1.00  0.96
	į	movement		movement	
1383658:		 		 	1
Deerton	50			Very limited	
	1	Too sandy	11.00		11.00
		Large stones   content	0.50 	Large stones   content	0.50 
Brownstone	1 40	  Very limited	 	  Very limited	1
	i	Too sandy	1.00	_	1.00
	I	Large stones	0.50	· -	0.50
	•	content			

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	  Pct.   of	· •		   Picnic areas 	
		Rating class and limiting features		Rating class and limiting features	
1383660:					I
	I 50	  Very limited	<u> </u>	  Very limited	i
	i	·	11.00	· -	11.00
	I	Large stones	0.50	•	10.50
	l .	•		content	
		Slope	10.37	Slope	10.37
Brownstone	I 40	  Very limited	<u> </u>	  Very limited	<u> </u>
	i		11.00	•	11.00
	I	Large stones	0.50	Large stones	0.50
	I	content	1	content	1
	!	Slope	0.37	Slope	10.37
1383662:		 	1	 	1
Abbaye	90	'  Somewhat limited	i	  Somewhat limited	i
-	i		0.98		0.75
	I	•		saturated zone	1
	l .	•	•	Too sandy	10.70
		Slope	10.37	Slope	10.37
1383665:	<u> </u>	! 	<u> </u>	! 	<u> </u>
Allendale	35	'  Very limited	i	  Very limited	i
	ĺ	Depth to	11.00	Depth to	11.00
	I	saturated zone	I	saturated zone	1
	l .	•	11.00	•	11.00
	!	•	  0.37	movement   Too sandy	I 10.37
	<u> </u>	100 Sandy 	10.37 I	100 Sandy 	10.37
Wakeley	30	Very limited	i	Very limited	i
	I	Depth to	1.00	Ponding	1.00
	I	•	•	Depth to	1.00
	!		•	saturated zone	10.00
			0.98 	Slow water   movement	0.98 
	i		0.30	•	10.30
	i	i -	i	i -	i
Kinross	20	Very limited	•	Very limited	1
	!	:	11.00	•	1.00
	!	•	  1.00	Ponding   Depth to	1.00  1.00
	i	•	11.00	· •	1
	i				i
1383960:	I	l	I	l	1
Flink	75	Very limited		Very limited	1
	!	<del>-</del>	1.00	=	1.00
			  1.00	•	1.00 
	i	l 100 Sanay	1		i
1444357:	I	I	I	l	I
Arnheim		_		Very limited	
	1	:	1.00		1.00
	I I		  1.00	Depth to   saturated zone	1.00 
	i		•	Flooding	0.40
	İ		•	Dusty	0.01
	I	I	I	I	1
1444359:		l 	!	l 	!
Beaches	ן 97/ ו	NOT rated	I I	Not rated	I
	1	ı	1	I	1

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	  Pct.   of	_		 	
	-	Rating class and		•	
	lunit	limiting features	<u>!</u>	limiting features	<u>!</u>
1444267.	!	!	!	 	1
1444367:	!	 	!	 	!
Udorthents, ravines and escarpments		  Not wated	!	  Not rated	!
and escarpments	1 03	I	i	l Iacea	<u> </u>
1444378:	i	i I	i	i İ	i
Wakefield	I 85	Verv limited	i	Very limited	i
	i	Depth to		Depth to	11.00
	ĺ	saturated zone	Ì	saturated zone	Ì
	I	Slow water	1.00	Slow water	1.00
	I	movement	1	movement	1
	l	Depth to	0.99	Depth to	0.99
	l	cemented pan	1	cemented pan	1
	l	Too sandy	0.01	Too sandy	0.01
	I	I	1	I	I
1444379:	l	]	!		1
Wakefield	85	Very limited		Very limited	
	l	Depth to		Depth to	1.00
	!	saturated zone   Slow water	•	saturated zone   Slow water	11.00
	! !	movement			11.00
	<u>'</u>	Depth to		Depth to	10.99
	<u>'</u>	cemented pan		cemented pan	1
	i	Slope		Slope	0.63
	i	Too sandy	0.01	·	0.01
	i	i	i	i	İ
1444388:	I	I	1	l	1
Allendale	80	Very limited	1	Very limited	1
	l	Depth to	1.00	Depth to	1.00
	I	saturated zone	1	saturated zone	1
	!	Slow water		Slow water	11.00
	!	movement	10 27	movement	10 27
	 	Too sandy 	10.37	Too sandy 	10.37
1444402:	' 	! 	i	! 	i
Tonkey	90	Very limited	i	Very limited	i
_	I	Depth to	1.00	Ponding	1.00
	I	saturated zone	1	Depth to	1.00
	I	Ponding	1.00	saturated zone	1
	I	Dusty	0.01	Dusty	0.01
	!	!	!	<u> </u>	!
1444410:	I 00	 	!		!
Tula	1 80	Very limited   Depth to		Very limited	11 00
	! !	bepth to   saturated zone	i	Depth to   saturated zone	11.00
	<u>'</u>	Depth to	I 10.97		I  0.97
	<u>'</u>	cemented pan	10.57	cemented pan	10.57
	i	Dusty	0.01	·	0.01
	i	<u>-</u>	1	, <u>,</u>	1
	İ	i İ	İ		İ
1444414:		Morry limited	1	Very limited	1
1444414: Lupton	40	Very limited			
	40 	Depth to	1.00	Ponding	1.00
	40   	_	1.00 	Ponding   Depth to	11.00
	40     	Depth to   saturated zone   Ponding	1	Depth to saturated zone	
	40       	Depth to   saturated zone   Ponding   Organic matter	İ	Depth to   saturated zone   Organic matter	1.00    1.00
	40   40     	Depth to   saturated zone   Ponding	1	Depth to Saturated zone Organic matter content	1.00 

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	  Pct.   of	·		   Picnic areas 	
	-	Rating class and limiting features		Rating class and   limiting features	
1444414: Cathro		saturated zone Ponding	1.00    1.00	Depth to saturated zone Organic matter content	    1.00  1.00    1.00    1.00
Tawas		saturated zone Ponding	1.00    1.00	Depth to saturated zone Organic matter content	  1.00  1.00    1.00    1.00
1444425: Lerch	   50             	saturated zone Ponding Too clayey	1.00 	Ponding Depth to saturated zone	   1.00  1.00  1.00   1.00
Herbster		Depth to   saturated zone	11.00	saturated zone	  1.00    1.00
1444426: Portwing	50       	Depth to   saturated zone	1.00 	  Very limited   Depth to   saturated zone   Slow water   movement	    1.00    0.96
Herbster	i I I	saturated zone	1.00 	  Very limited   Depth to   saturated zone   Slow water   movement	  1.00    1.00
1444427: Cornucopia	   80       	  Somewhat limited   Slow water   movement   Slope	0.96	movement	    0.96    0.37
1444428: Cornucopia	   80       	  Very limited   Slope   Slow water   movement	    1.00  0.96 	•	    1.00  0.96
1444431: Croswell	82         	•	1.00  0.39 	·	    1.00  0.19 

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

and soil name	Pct.  Of	•		 	
	_	Rating class and limiting features		Rating class and   limiting features	Value
1444432:	 	 	 	 	1
Gogebic	85	Very limited	1	Very limited	1
	I	Depth to	1.00	· •	1.00
	!	saturated zone		saturated zone	
	!	Slow water   movement	1.00	Slow water   movement	1.00
	!	Depth to	I IO 71	Depth to	  0.71
	i	cemented pan	1	cemented pan	1
	i	Large stones	•	Large stones	0.50
	!	content	1	content	1
1444435:		 		 	
Iosco	85	Very limited	1	Very limited	1
	1	Depth to	11.00	•	11.00
	!	saturated zone	10.60	saturated zone	10 60
	!	Too sandy   Slow water	0.60  0.22	·	0.60  0.22
	i	movement		movement	10.22
1444457.	!	<u> </u>	1		1
1444457: Redrim	I I 85	  Very limited	<u> </u>	  Very limited	
-10-42	i	Too sandy	11.00	•	11.00
	i	Depth to bedrock		·	
	I	Large stones	10.50	Large stones	10.50
	1	content	1	content	1
1444459:		 		 	
Zeba	90	Very limited	1	Very limited	1
	I	Depth to	1.00	· •	1.00
	!	saturated zone		saturated zone	
	!	Large stones   content		Large stones	10.50
	i	Too sandy	  0.31	content   Too sandy	  0.31
1444460:	1	  -		 	
Abbaye	ı I 55	  Somewhat limited	i	  Somewhat limited	i
2	i	Depth to	0.98		0.75
	I	saturated zone	1	saturated zone	1
	1	Too sandy 	10.70	Too sandy 	10.70
Lapoin	40	  Somewhat limited	i	  Somewhat limited	i
	I	Depth to	0.98	Slow water	10.96
	!	saturated zone	•	movement	
	!	Slow water   movement	10.96	Depth to   saturated zone	10.75
	i		i	Sacuraced zone	i
1444461:	   EF	  Companie   limited	1	  Comowhat limited	1
Abbaye	1 22	Somewhat limited   Depth to	I  0.98	Somewhat limited   Depth to	I  0.75
	<u> </u>	saturated zone		saturated zone	10.75
	i	Too sandy	0.70		0.70
	İ	Large stones	10.50	Large stones	10.50
	1	content		content	1
Zeba	40	  Very limited		  Very limited	
	I	Depth to	1.00	Depth to	1.00
	I	saturated zone		saturated zone	1
	1	Large stones	10.50	•	10.50
	I I	content   Too sandy	  0.31	content   Too sandy	  0.31
		, 100 Sandy	10.31	, 100 Sandy	

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	Pct.  Of	      Camp areas 		   Picnic areas 	
	-	Rating class and		•	
	lunit	limiting features	<del>!</del>	limiting features	<u> </u>
1444477:	!	 	!	İ	!
Cublake	1 35	ı  Verv limited	i	  Very limited	<u> </u>
Cabrane			1.00		1.00
	i	Depth to		Depth to	0.19
	İ	saturated zone	İ	saturated zone	Ì
	1	I	1	I	1
Croswell		•		Very limited	1
	!		•	Too sandy	1.00
	!	Depth to		Depth to	0.19
	!	saturated zone	1	saturated zone	1
Ashwabay	1 20	ISomewhat limited	i	  Somewhat limited	i
non-wasay	•	•	•	Too sandy	10.87
	i	,	1	, <u>-</u>	1
1444478:	İ	Ì	İ	l	Ì
Cublake	35	Very limited	1	Very limited	1
	1	· <u>-</u>	1.00	·	1.00
	I	Depth to	•	Slope	10.37
	!	saturated zone		Depth to	0.19
	!	Slope		saturated zone	
Croswell	1 20	  Very limited	1	  Very limited	
CIOSWEII	1 20	· -		•	11.00
	i	Depth to		Depth to	10.19
	i	saturated zone	i	saturated zone	i
	I	Slope	0.04	Slope	0.04
	1	I	1	I	1
Ashwabay	•	•	•	Somewhat limited	
	!	•			10.87
	!	Depth to   saturated zone		•	0.37  0.19
	1	Slope		Depth to   saturated zone	U.19
	i	l brope	1	l sacuracea zone	i
1444479:	i	i	i	i İ	i
Morganlake	85	Somewhat limited	İ	Somewhat limited	Ì
	1	Depth to	0.98	Depth to	10.75
	1	saturated zone			1
	I	· <u>-</u>		Too sandy	10.72
	!		0.22	Slow water	10.22
	!	movement	1	movement	!
1444480:	1	! !	1	I I	1
Morganlake	1 85	  Somewhat limited	i	  Somewhat limited	i
	i	Depth to	0.98	•	0.75
	i	saturated zone		saturated zone	i
	1	Too sandy	0.72	Too sandy	10.72
	1	Slope	0.37	Slope	10.37
	I	Slow water	0.22		10.22
	I	movement	1	movement	I
1444401.	1	  -	I	 	I
1444481: Kellogg	1 35	  Very limited	1	  Very limited	1
rettoda	1 35 1	Very limited   Too sandy	1	_	11.00
	i	Slow water	10.99	· -	10.99
	i	movement	1	movement	
	I	Depth to	0.98	Depth to	0.75
	I	saturated zone	1	saturated zone	1
	1	I	1	l	1

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	  Pct.   of	· -		   Picnic areas 	
		Rating class and limiting features		Rating class and   limiting features	
	!	!	!	!	!
1444481: Allendale	I   25 	  Very limited   Depth to		  Very limited   Depth to	    1.00
	I	saturated zone	I	saturated zone	1
	!	Slow water	11.00	•	11.00
	1	movement   Too sandy	I 10.37	movement   Too sandy	  0.37
	! 	100 Sandy 	10.57	100 Sandy 	10.57
Ashwabay	20 	Somewhat limited   Too sandy	  0.87	Somewhat limited   Too sandy	  0.87
	i	i	i	i	İ
1444482:	l	l	1	I	1
Kellogg	40	Very limited		Very limited	1
	!	•	11.00	·	11.00
	1	Slow water   movement	•	Slow water   movement	10.99
	<u> </u>	Depth to		Depth to	l 10.75
	i	saturated zone	i	saturated zone	i
	l I	Slope	0.37	Slope	0.37
Allendale	ı I 25	  Very limited	i	  Very limited	i
	İ	Depth to		Depth to	11.00
	I	saturated zone	I	saturated zone	1
	Į.	Slow water	•	Slow water	11.00
	l	movement	10 27	movement	10 27
	! !	Too sandy   Slope	0.37	Too sandy   Slope	10.37
Ashwabay	I I 20	  Somewhat limited	<u> </u>	  Somewhat limited	
	İ	Too sandy	0.87	•	0.87
	 	Slope	0.37	Slope	10.37
1444486:	İ	! 	i	! 	i
Sedgwick	50	Very limited	I	Very limited	I
	I	Depth to	1.00	Depth to	11.00
	l	saturated zone		saturated zone	
	1	Slow water   movement	0.99 	Slow water   movement	0.99 
	! 	Dusty	•	Dusty	0.01
		<u> </u>	1	<u> </u>	1
Munuscong	] 30	Very limited		Very limited	11 00
	! !	Depth to   saturated zone		Ponding   Depth to	1.00  1.00
	<u> </u>	Ponding	11.00	•	1
	i	Slow water	0.96		0.96
	I	movement	I	movement	I
	 	Dusty 	0.01 	Dusty 	0.01 
1444487:	İ	i İ	i	i İ	i
Superior	50	Very limited		Very limited	1
	!	Depth to	11.00	•	11.00
	I 1	saturated zone   Slow water	I I1 00	saturated zone	11 00
	I I	Slow water   movement	11.00	Slow water   movement	1.00 
	i	Dusty	0.01		0.01
	i	i	I	i İ	

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol and soil name	  Pct.   of	· •		   Picnic areas 	
		Rating class and limiting features		Rating class and   limiting features	
1444400	!	!	!	!	Ī
1444487: Sedgwick	1 30	  Town limited	1	  Very limited	!
seagwick		Depth to	  1.00	•	11.00
	i	saturated zone	1	saturated zone	1
	i	Slow water	•	Slow water	0.99
	ĺ	movement	İ	movement	Ì
	l	Too sandy	10.70	Too sandy	10.70
	I	Dusty	0.01	Dusty	0.01
1444400.	!		!		!
1444488: Superior	I I 50	  Very limited	!	  Very limited	!
superior	1 20	Depth to		Depth to	11.00
	i	saturated zone	1	· •	1
	i	Slow water	•	Slow water	11.00
	i	movement	i	movement	i
	l	Slope	10.37	Slope	10.37
	I	Dusty	0.01	Dusty	0.01
			!		!
Sedgwick	•	Very limited		Very limited	11 00
	!	Depth to   saturated zone	:	Depth to   saturated zone	1.00 
	<u> </u>	Saturated Zone	•	Slow water	10.99
	i	movement	1	movement	1
	i	Too sandy	0.70	•	0.70
	I	Dusty	0.01	Dusty	0.01
	I	l	I	I	1
1444489:			!		!
Sultz		Very limited		Very limited	11 00
		Slope   Too sandy	1.00  1.00	· -	1.00  1.00
	i	l 100 sanay	1	biope	1
Ashwabay	25	Very limited	i	Very limited	i
	I	Slope	1.00	Slope	11.00
	1	Too sandy	10.87	Too sandy	0.87
D. 10.10.00	1		!	 	!
Rubicon		Very limited   Slope		Very limited   Too sandy	1
	;	Slope   Too sandy	11.00	· -	11.00
	i	l 100 banay	1	l Siope	1
1444492:	ĺ	l	İ	İ	Ì
Manistee	40	Very limited	I	Very limited	1
	I	•	11.00	•	11.00
	!	Slow water	11.00	· -	1.00
	!	movement	11 00	Slow water	1.00
		Too sandy 	11.00	movement	
Kellogg	,   30	  Very limited	i	  Very limited	i
33	i	Slope	11.00	_	11.00
	I	Too sandy	1.00	Slope	11.00
	I	Slow water	0.99		0.99
	1	movement		movement	
	l	Depth to	0.98	•	10.75
	I I	saturated zone		saturated zone	
Ashwabay	I I 20	  Very limited		  Very limited	1
	, 20 I	Slope	11.00	_	11.00
	i	Too sandy	10.87	•	10.87
	I	I -	İ	l -	i

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	Pct.  Camp areas     of		Picnic areas		
		Rating class and limiting features		Rating class and   limiting features	
1444506:	 	 	 	 	 
Keweenaw	60	Somewhat limited	i	Somewhat limited	i
	 	Too sandy 	0.76 	Too sandy 	0.76 
Rubicon	30	  Very limited	i	  Very limited	i
		Too sandy	1.00	Too sandy	11.00
1444507:	! 	 	! 	! 	i
Keweenaw	60		•	Somewhat limited	
	 	·	0.76  0.16	Too sandy   Slope	0.76  0.16
	i	Ī	ĺ	Ī	i
Rubicon	30			Very limited	11 00
	! 	·	10.37	Too sandy   Slope	1.00  0.37
	İ	<u>.</u> !	İ		
1444585: Meehan, beaches	l I 90	  Verv limited	 	  Very limited	1
meenan, beaches	30	•	11.00	•	11.00
			•	Depth to	11.00
	 	Too sandy 	1.00 	saturated zone 	1
1444586:	i	İ	i	İ	i
Wurtsmith, beaches	90		  1.00	Very limited   Too sandy	  1.00
	! 	· •	10.39	•	10.19
	İ		İ	saturated zone	į
1444587:	 	 	 	 	1
Grayling, beaches	95			Very limited	i
	 	Too sandy 	11.00	Too sandy 	11.00
1529830:	i	! 	i	' 	i
Meehan, beaches	90	•		Very limited	
	 		1.00 	Too sandy   Depth to	1.00  1.00
	i	•	11.00	•	i
1700372:	 	l I	1	 	1
Loxley	40	  Very limited	i	  Very limited	i
	!		11.00	•	1.00
	 		  1.00	Depth to   saturated zone	1.00 
	i		11.00	•	11.00
	ļ .	content	I	content	I 10 01
	 	Dusty 	0.01 	Dusty 	0.01 
Beseman	30	Very limited		Very limited	i .
	 		1.00 	Ponding   Depth to	1.00  1.00
			1.00	•	1
	!		11.00	•	11.00
	 	content   Slow water	  0.22	content   Slow water	  0.22
	i	movement	1	movement	1
Dawson	   29	  Very limited	 	  Very limited	1
Dawson		=	  1.00	Very limited   Ponding	1
	1	saturated zone	ĺ	Depth to	11.00
	 	•	1.00  0.01		  0.01
	İ		I	, <i>5</i> 430 <u>y</u> 	10.01

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

	  Pct.   of	•		 	
į	map	Rating class and limiting features		Rating class and limiting features	
1700373:	 	 	1	 	1
Rifle	90	  Very limited	i	  Very limited	i
	I	Depth to	1.00	Ponding	1.00
	I		I	•	1.00
	ļ .	•		saturated zone	
	 	Dusty 	10.01	Dusty 	0.01
1700374:	İ	' 	i	! 	i
Allendale	35	•		Very limited	I
	!	:		Depth to	11.00
	!			saturated zone   Slow water	11 00
	! !	•	•	slow water   movement	1.00 
	i	•	•	Too sandy	0.37
Walasiass			!		I
Wakeley		Very limited   Depth to	  1.00	Very limited   Ponding	1
	<u> </u>	· •	•	Depth to	11.00
	i			saturated zone	i
	I	Slow water	0.98	Slow water	0.98
	l		1	movement	1
	 	Too sandy 	10.30	Too sandy 	10.30
Kinross	20	  Very limited	i	  Very limited	i
	I	· -	1.00	Too sandy	1.00
	ļ .		•	Ponding	1.00
	!	•		Depth to	1.00
	! 	Too sandy 	1.00 	saturated zone 	i
1702605:	l	!	ļ	<u> </u>	I
Menominee	85	•		Very limited	
	! !	•	1.00  0.72	·	1.00  0.72
	i	•		Slow water	10.72
	į			movement	į
1702606:	 	 		 	
Deerton	,   50	  Very limited	i	  Very limited	i
	I	Too sandy	1.00	Too sandy	1.00
	ļ .	•	10.50	•	10.50
	 	content		content	
Brownstone	40	  Very limited	i	  Very limited	i
	I	Too sandy	1.00	Too sandy	1.00
	!	Large stones	10.50		10.50
	 	content 		content 	
1702607:	i	İ	i	i İ	i
Deerton	50	Very limited		Very limited	
	l	Too sandy	11.00	•	11.00
	I I	Large stones   content	0.50 	Large stones   content	0.50 
	İ	Slope	0.37	•	0.37
December -				 	1
Brownstone	4:U 	Very limited   Too sandy	  1.00	Very limited   Too sandy	  1.00
		, 100 Sandy	1	, 100 Sandy	
	1	Large stones	10.50	Large stones	10.50
	 	Large stones   content	0.50 	Large stones   content	0.50 

Table 7.—Recreation, Part I (Camp and Picnic Areas)—Continued

Map unit symbol	  Pct.	   Camp areas		Picnic areas	
and soil name	of	<u>-</u>		İ	
	map	Rating class and	Value	Rating class and	Value
		limiting features	•	limiting features	•
	ī	I	T	I	ī
1702608:	1	l	1	I	1
Abbaye	-  90	Somewhat limited	1	Somewhat limited	1
	1	Depth to	10.98	Depth to	10.75
	1	saturated zone	1	saturated zone	1
	1	Too sandy	10.70	Too sandy	10.70
	1	Slope	10.37	Slope	10.37
	1	I	1	I	1
1711685:	1	I	1	I	1
Cublake	-  50	Very limited	1	Very limited	1
	1	Too sandy	1.00	Too sandy	11.00
	1	Depth to	10.39	Depth to	0.19
	1	saturated zone	1	saturated zone	1
	1	I	1	I	1
Keweenaw	-  30	Somewhat limited	1	Somewhat limited	1
	1	Too sandy	10.76	Too sandy	10.76
	1	ı	1	Ι -	1

Table 7.—Recreation, Part II (Trail Management)

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol	  Pct.	      Foot traffic an	.d	       Mountain bike a	nd
		equestrian trai		off-road vehicle t	rails
	map	Rating class and	Value	Rating class and	Value
	unit	limiting features	1	limiting features	1
	ī	I	ī	I	ī
433292:	I	I	1	I	1
Lerch	50		1	Very limited	1
	I	-		Depth to	1.00
	I		•	•	1
	I				11.00
	!	Ponding	11.00	Ponding	11.00
		l	!	l	!
Herbster		-		Very limited	1 00
	!	-			1.00
	!	saturated zone	1	saturated zone	!
433296:	!	! :	1	! !	!
Cublake	I I 35	  Very limited	i	  Very limited	1
Cubiake					11.00
	:	ı 100 sandy	1	ı 100 sandy	1
Croswell	1 20	  Very limited	i	  Very limited	i
CIOSWEII		-		Too sandy	11.00
	:	100 0aa.g	1		1
Ashwabay	•	•	i	'  Somewhat limited	i
				•	0.87
	i	I	i	I	i
433299:	i	İ	i	İ	i
Cublake	35	Very limited	İ	Very limited	İ
	I	Too sandy	1.00	Too sandy	1.00
	I	I	1	I	1
Croswell	20	Very limited	1	Very limited	1
	I	Too sandy	1.00	Too sandy	1.00
	I	I	1	I	1
Ashwabay				Somewhat limited	1
	I	Too sandy	0.87	Too sandy	0.87
	!	!	!	!	!
433300:		<u> </u>	!	<u> </u>	!
Kellogg				Very limited	
				. =	11.00
	!	•		Depth to   saturated zone	0.44 
	!	saturated zone		Saturated zone	1
Allendale	1 25	  Very limited	i	  Very limited	1
ATTENDATE		Depth to		Depth to	11.00
					1
	i	Too sandy	•	•	10.37
	i	100 0aa.g	1		1
Ashwabay	i 20	Somewhat limited	i	Somewhat limited	i
				Too sandy	0.87
	İ	i I	i	I	i
433301:	İ	i I	İ	İ	i
Kellogg	40	Very limited	i	Very limited	I
	I	Too sandy		Too sandy	1.00
	I	Depth to	0.44	Depth to	0.44
	I	saturated zone	1	saturated zone	1
	I	l	1	l	I

Table 7.—Recreation, Part II (Trail Management)—Continued

	Pct. Of	Foot traffic an   equestrian trai	d ls	Mountain bike a   off-road vehicle t	nd rails
	map	Rating class and			
	-	limiting features		limiting features	
422201		<u> </u>	!		1
433301: Allendale	l I 25	  Very limited	<u> </u>	  Very limited	1
ATTENDATE		Depth to		Depth to	11.00
	i	saturated zone		saturated zone	1
	İ			Too sandy	0.37
5 - 1 1			!		1
Ashwabay			•	Somewhat limited   Too sandy	I  0.87
	' 	100 sandy 	I	100 sandy 	10.07
433304:	i İ	İ	i	i İ	i
Sedgwick	50	Very limited	I	Very limited	1
	I	Depth to	1.00	Depth to	1.00
	!	saturated zone		saturated zone	
	 	Dusty	10.01	Dusty	0.01
Munuscong	1 1 30	  Very limited	i	  Very limited	i
		· -		Depth to	11.00
	İ	saturated zone	i	•	i
	l	Ponding	1.00	Ponding	1.00
		Dusty	0.01	Dusty	0.01
433305:	 	 	!	 	!
Superior	I I 50	  Very limited	<u> </u>	  Very limited	<u> </u>
Superior		Depth to		Depth to	11.00
	i	saturated zone	i	saturated zone	i
	ĺ	Dusty	0.01	Dusty	0.01
	l	I	I	l	I
Sedgwick		Very limited		Very limited	
	!	· -		Depth to   saturated zone	1.00
	<u>'</u>			•	l  0.70
	i I	· •	0.01	· -	10.01
	İ	i -	i	i -	i
433309:	l	l	I	l	1
Superior	50	· -		Very limited	
				Depth to	1.00
	l I		  1 00	saturated zone   Water erosion	  1.00
	' 		10.01		0.01
	i i	I	İ		i
Sedgwick	30	Very limited	I	Very limited	I
	l	•		· •	1.00
	!	saturated zone		saturated zone	
		Too sandy		Too sandy	10.70
	 	Dusty 	0.01 	Dusty 	0.01 
433310:	İ		i		i
	35	Very limited	i	Very limited	i
	I	Too sandy	1.00	Too sandy	1.00
	!	Slope	11.00	Slope	10.22
	I	<u> </u>	!	  Comprehet limited	1
3 aharahara	. a.		1	Somewhat limited	1
Ashwabay	   25 	Somewhat limited			10 27
Ashwabay	'   25 	Slope	0.92	Too sandy	0.87 
Ashwabay	   25     			Too sandy	0.87   
Ashwabay	     	Slope	0.92  0.87 	Too sandy	0.87     
-	     	Slope   Too sandy 	0.92  0.87 	Too sandy   	0.87          1.00

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct.   of	Foot traffic an   equestrian trai	d ls	Mountain bike and   off-road vehicle trails		
		Rating class and				
	lunit	limiting features	<u>i</u>	limiting features	<u>i                                      </u>	
40004.4	!	  -	!	<u> </u>	!	
433314: Manistee	I I 40	  Vor: limited	 	  Very limited	1	
Manis tee		·	1	·	1	
	i	·	11.00	_	10.22	
	i	 	i	 	i	
Kellogg	30	Very limited	İ	Very limited	İ	
	I	Too sandy	1.00	Too sandy	1.00	
	1	·		Depth to	0.44	
	!	·		saturated zone	!	
	!	saturated zone	1	 	1	
Ashwabay	1 20	l  Very limited	<u> </u>	  Somewhat limited	!	
Ashwabay		· -		Too sandy	10.87	
	i	Too sandy		Slope	0.22	
	ĺ	<u>-</u> I	İ	Ī	İ	
433326:	I	l	I		1	
Rubicon	85	· -	•	Very limited	1	
	1	Too sandy	11.00	Too sandy	11.00	
433379:	!	 	!	<u> </u>	!	
Allendale	I 80	l Waru limitad	<u> </u>	  Very limited	!	
Allendale	1	· -	•	Depth to	11.00	
	i	saturated zone		saturated zone	1	
	i	Too sandy		Too sandy	0.37	
	ĺ	i -	İ	i İ	İ	
433515:	I	1	I	1	I	
Lupton		·		Very limited		
	!	Depth to		Depth to	1.00	
				saturated zone   Organic matter	  1.00	
	<u> </u>	content	_	content	I	
	i	•	•	•	11.00	
	i	•		Dusty	0.01	
	I	l	I		I	
Cathro		· <del>-</del>		Very limited		
	!	Depth to		Depth to	11.00	
	!		11 00		  1.00	
	;	organic matter   content	11.00 I	Organic matter   content	11.00 I	
	i	•	•		11.00	
	i			Dusty	0.01	
	I	l	I		I	
Tawas	25	· -		Very limited	1	
	1	Depth to	11.00	=	11.00	
	!	saturated zone	•	saturated zone	11 00	
	!	Organic matter   content	1.00 	Organic matter   content	1.00 	
	i	Ponding	11.00	•	11.00	
	i	Dusty	0.01		0.01	
	I	- I	I	- I	I	
433572:	l	I	I	I	I	
Portwing	50	·		Very limited		
	l	Depth to	11.00		11.00	
	I I	saturated zone	I	saturated zone	I	
Herbster	1 30	  Very limited	<u> </u>	  Very limited	1	
	, 50 I	Depth to	11.00		11.00	
	I	saturated zone	_	saturated zone		
	l	I	İ	I	Ì	

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol				   Mountain bike and   off-road vehicle trails	
	map	<del></del>		Rating class and	
	-	limiting features		limiting features	
433573: Cornucopia		•	      1.00	    Very limited   Water erosion 	      1.00
433582: Croswell	   82   	• •	    1.00	  Very limited   Too sandy 	    1.00
433599: Annalake	   85 	  Not limited 		  Not limited 	
433600: Annalake	   80 	  Not limited 	   	  Not limited 	 
433671: Arnheim	•	Depth to Saturated zone Ponding Flooding	1.00    1.00  0.40	•	  1.00    1.00  0.40  0.01
433676: Redrim	   85     	Too sandy	    1.00  0.50	•	    1.00  0.50
433679: Lapoin	     85   	Depth to	0.44	  -  Somewhat limited   Depth to   saturated zone 	      0.44 
433686: Zeba		Depth to saturated zone Large stones content	1.00    0.50	  Very limited   Depth to   saturated zone   Large stones   content   Too sandy	  1.00    0.50    0.31
433729: Sultz	     85 	    Very limited   Too sandy		    Very limited   Too sandy	      1.00
433739: Moquah		Flooding   Dusty		•	    0.40  0.01  0.01
433771: Beaches	     97 	    Not rated 	! 	    Not rated 	
433802: Udorthents, ravines and escarpments		  -    Not rated	     	      Not rated	     
452739: Water		    Not rated 	     	    Not rated 	     

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct.   of	Foot traffic an   equestrian trai	d ls	Mountain bike and   off-road vehicle trails		
		Rating class and limiting features	Value		Value	
452765:	 	 	 	 		
Abbaye	•	Too sandy	0.70  0.44	Somewhat limited   Too sandy   Depth to   saturated zone	  0.70  0.44 	
Lapoin			0.44	  Somewhat limited   Depth to   saturated zone	    0.44 	
1383557:	! 	 	 	 		
Au Gres		Depth to   saturated zone	1.00 	Very limited   Depth to   saturated zone   Too sandy	  1.00    0.50	
1383580:	i	' 	i	' 	i	
Loxley	•	Depth to	11.00	Very limited   Depth to   saturated zone	  1.00 	
	 			Organic matter   content	1.00 	
	 	Dusty	1.00  0.01 	Ponding   Dusty 	1.00  0.01 	
Beseman	   30         	   Depth to   saturated zone   Organic matter   content	  1.00    1.00	  Very limited   Depth to   saturated zone   Organic matter   content   Ponding	  1.00    1.00 	
Dawson	   28         	  Very limited   Depth to   saturated zone   Ponding	1.00    1.00	  Very limited   Depth to   saturated zone   Ponding   Dusty	  1.00    1.00  0.01	
1383581: Rifle	90           	Depth to   saturated zone	1.00    1.00	  Very limited   Depth to   saturated zone   Ponding   Dusty 	    1.00    1.00  0.01	
1383603: Cornucopia	   80   	Water erosion		  Very limited   Water erosion   Slope	    1.00  0.22	
1383658:	i	I	i		i	
Deerton	50     	Too sandy	  1.00  0.50 	·	  1.00  0.50	
Brownstone	   40       		    1.00  0.50 	·	  1.00  0.50 	

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct.	Foot traffic an   equestrian trai	Foot traffic and   Mountain b equestrian trails   off-road vehi		
		Rating class and	Value	Rating class and	Value
	lunit	limiting features	<u> </u>	limiting features	<u> </u>
1383660:	<u> </u>	! 	i	! 	i
Deerton	50	Very limited	1	Very limited	1
	I	•	11.00	•	11.00
	!	Large stones	10.50	Large stones	10.50
	!	content	!	content	!
Brownstone	1 40	  Verv limited	i	  Very limited	i
		•	•	Too sandy	11.00
	1	Large stones	10.50	Large stones	10.50
	1	content	1	content	1
1383662:	!		1		!
	I I 90	  Somewhat limited	i	  Somewhat limited	<u> </u>
	1		•	Too sandy	10.70
	i	·		Depth to	0.44
	I	saturated zone	1	saturated zone	1
	1	<u> </u>	1	<u> </u>	1
1383665:	25	  Town limited	1	  Very limited	!
Allendale		• •	•	very limited   Depth to	11.00
	i .	saturated zone	•	saturated zone	1
	i	Too sandy		Too sandy	0.37
	I	l -	1	l	1
Wakeley		· -		Very limited	1
	!	•		Depth to	11.00
	!	saturated zone   Ponding	•	saturated zone   Ponding	11.00
	i		•	Too sandy	10.30
	i	İ	İ	i	İ
Kinross	20	· -		Very limited	1
	!	_		Depth to	11.00
	!	saturated zone	•	saturated zone	•
		•		Too sandy   Ponding	1.00  1.00
	i		1	101142119	1
1383960:	İ	İ	İ	İ	İ
Flink	75	Very limited		Very limited	1
	!	•		Depth to	11.00
	1	saturated zone   Too sandy	•	saturated zone   Too sandy	11.00
	<u> </u>	100 Sandy 	11.00	100 Sandy 	1
1444357:	i	i İ	i	I	i
Arnheim	85	Very limited	1	Very limited	1
	I	Depth to	1.00	•	1.00
	!	saturated zone	1 00	saturated zone	1
	!	Ponding   Flooding	1.00  0.40	•	1.00  0.40
	i	Dusty	0.40	•	10.40
	i	i -	i	i -	i
1444359:	I	l	1	l	I
Beaches	97	Not rated	!	Not rated	!
1444367:	1	] 	1	] 	1
Udorthents, ravines	1	' 	i	' 	i
and escarpments		Not rated	İ	  Not rated	i
	1	I	I	I	1
1444378:			!		!
Wakefield	1 85	=		Very limited	I I1 00
	1	Depth to   saturated zone	1.00 	Depth to   saturated zone	1.00 
	i	Too sandy	0.01		0.01
	i	I		<u>-</u>	i

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct.  of	   Foot traffic an   equestrian trai	d ls	   Mountain bike a   off-road vehicle f	and crails
	-	Rating class and limiting features	Value		Value
1444379:	I I	 	I I	   	I
Wakefield	85	  Very limited	i	  Very limited	i
	I	· •		Depth to	1.00
	!		•	saturated zone   Too sandy	10.01
	i	100 Sandy 	I	100 Sandy 	10.01
1444388:	1	I	I	I	1
Allendale	1 80	Very limited   Depth to	•	Very limited   Depth to	11.00
	i	saturated zone		saturated zone	•
	i	•		Too sandy	0.37
1444402:	1		!		1
Tonkey	1 90	  Very limited	<u> </u>	  Very limited	i
-	i	·		Depth to	11.00
	1	•	•	saturated zone	•
	!	•		Ponding	1.00  0.01
	<u> </u>	Dusty 	10.01 I	Dusty 	10.01
1444410:	İ	l	İ	l	İ
Tula	80	•		Very limited   Depth to	  1.00
	i .	saturated zone		bepth to   saturated zone	•
	i		•	Dusty	0.01
1444414:	1	<u> </u>	!	<u> </u>	I
Lupton	1 40	  Very limited	<u> </u>	  Very limited	i
-		•	11.00	Depth to	11.00
	1			saturated zone	
	!	•		Organic matter   content	1.00 
	i	•	•	Ponding	11.00
	İ	Dusty	0.01	Dusty	10.01
Cathro	   30	  Very limited	 	  Very limited	1
Cathiro		•		Depth to	11.00
	1			saturated zone	1
	!		•	Organic matter	11.00
	<u> </u>	•	•	content   Ponding	1
	i		•	Dusty	0.01
Marrag		 	!	  Town limited	1
Tawas	25 	Very limited   Depth to	  1.00	Very limited   Depth to	  1.00
	i	saturated zone	İ	saturated zone	i
	1	Organic matter	11.00	•	11.00
	!	content   Ponding	  1.00	content   Ponding	  1.00
	i	•	10.01		10.01
	!	<u>!</u>	ļ.	<u> </u>	1
1444425: Lerch	   50	  Very limited	 	  Very limited	1
	i	Depth to	11.00	_	11.00
	1	saturated zone	İ	saturated zone	İ
	1		11.00	Too clayey	1.00
		Ponding 	1.00 	Ponding 	1.00 
Herbster	35	Very limited		Very limited	ĺ
	1	·	11.00	·       •	11.00
	I	saturated zone	!	saturated zone	1

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	  Pct.   of	   Foot traffic and   equestrian trai	d ls	   Mountain bike a   off-road vehicle t	nd rails
		Rating class and			
	_	limiting features		limiting features	
1444426: Portwing		· _	11.00	•	      1.00
Herbster		· _	11.00	  Very limited   Depth to   saturated zone 	    1.00 
1444427: Cornucopia		  Very limited   Water erosion 	    1.00	  Very limited   Water erosion 	    1.00
1444428: Cornucopia		Water erosion	11.00	  Very limited   Water erosion   Slope 	    1.00  0.22
1444431: Croswell	•		•	  Very limited   Too sandy 	    1.00
1444432: Gogebic			1.00    0.50	Depth to   saturated zone	  1.00    0.50
1444435: Iosco		Depth to saturated zone	1.00 	  Very limited   Depth to   saturated zone   Too sandy 	    1.00    0.60
1444457: Redrim	   85       	Too sandy	1.00  0.50	  Very limited   Too sandy   Large stones   content 	  1.00  0.50 
1444459: Zeba	   90             	Depth to   saturated zone   Large stones   content	   1.00   1.00   0.50   0.31	saturated zone   Large stones   content	  1.00    0.50    0.31
1444460: Abbaye	   55     	· •	0.70 0.44	  Somewhat limited   Too sandy   Depth to   saturated zone	  0.70  0.44
Lapoin		Depth to	0.44	  Somewhat limited   Depth to   saturated zone 	    0.44 

Table 7.—Recreation, Part II (Trail Management)—Continued

and soil name	of	   Foot traffic and   equestrian trai	ls		rails
	-	Rating class and limiting features		•	
1444461:	I I	   	I I	] 	Ī I
	ı I 55	  Somewhat limited	<u> </u>	  Somewhat limited	i
122436	1		10.70	•	10.70
	i	· -	•	Large stones	10.50
	i	=		content	i
	İ	Depth to	0.44	Depth to	0.44
	Į.	saturated zone	Į.	saturated zone	!
Zeba	I I 40	  Very limited	 	  Very limited	1
	i			Depth to	11.00
	ĺ	saturated zone	ĺ	saturated zone	Ì
	I	Large stones	0.50	Large stones	10.50
	I	content	I	content	1
	l	Too sandy	0.31	Too sandy	0.31
1444477:	! 	! 	i	! 	i
Cublake	35	Very limited	I	Very limited	1
	ļ .	Too sandy	11.00	Too sandy	1.00
Croswell	I I 20	  Verv limited	<u> </u>	  Very limited	1
		Too sandy	•	· •	11.00
			1		!
Ashwabay		Somewhat limited   Too sandy		Somewhat limited	I  0.87
	! 	100 sandy 	10.67 I	100 sandy 	10.67 I
1444478:	i	i İ	i	İ	i
Cublake		Very limited	1	Very limited	1
	 	Too sandy	1.00 	Too sandy 	11.00
Croswell	20			  Very limited	i
		Too sandy	11.00	Too sandy	11.00
Ashwabay	l l 20	  Somewhat limited	 	  Somewhat limited	1
<b>-</b>				Too sandy	0.87
	I	l	l	l	1
1444479: Morganlake	   85	  Somewhat limited		  Somewhat limited	1
Horganiake	1			Too sandy	10.72
	i	•	•	Depth to	10.44
	i	saturated zone		saturated zone	i
1444400.	ļ .		!	<u> </u>	I
1444480: Morganlake	I I 85	  Somewhat limited		  Somewhat limited	1
Horganiake	1	•	0.72	•	0.72
	i		0.44	<del>-</del>	0.44
	i	saturated zone	1	saturated zone	I
1444401.	l				!
1444481: Kellogg	ı I 35	ı  Very limited		  Very limited	
	 I	•	11.00	_	11.00
	i			Depth to	0.44
	ļ	saturated zone	ļ.	saturated zone	!
Allendale	l I 25	  Verv limited	 	  Very limited	1
				Depth to	1.00
	I	saturated zone	i	saturated zone	İ
	l	Too sandy	0.37	Too sandy	10.37
Ashwabay	I I 20	  Somewhat limited		  Somewhat limited	1
<u></u>	• 		0.87		0.87
	I	· •		i -	i

Table 7.—Recreation, Part II (Trail Management)—Continued

	  Pct.   of	Foot traffic and   equestrian train	d ls	,   Mountain bike a   off-road vehicle t	nd rails
		Rating class and			
· · · · · · · · · · · · · · · · · · ·	unit	limiting features	<u> </u>	limiting features	1
1444400.			!		I
1444482: Kellogg	I I 4∩	  Very limited		  Very limited	!
Refrogg	1 -20	•	1.00	·	11.00
	i	·	0.44	· •	10.44
	i	saturated zone		saturated zone	
	l	I	l	l	1
Allendale		•		Very limited	
	!			Depth to	1.00
	!	•		saturated zone   Too sandy	I  0.37
		Too sandy 	U . 3 / 	Too sandy 	10.37
Ashwabay	20	  Somewhat limited	i	  Somewhat limited	i
-	ĺ	Too sandy	0.87	Too sandy	0.87
	I	I	I	l	1
1444486:			ļ		!
Sedgwick		Very limited   Depth to		Very limited	I 11 00
	!	=		Depth to   saturated zone	1.00
				Saturated zone   Dusty	  0.01
	i	l Duscy	10.01	Dusty 	10.01
Munuscong	30	Very limited	i	Very limited	i
	I	Depth to	1.00	Depth to	11.00
	l	saturated zone	I	saturated zone	1
	I	Ponding	1.00	Ponding	1.00
	1	Dusty	0.01	Dusty	10.01
1444487:		 			!
Superior	I I 50	  Very limited	 	  Very limited	1
	1	· -		Depth to	11.00
	i	=		saturated zone	i
	ĺ	Dusty	0.01	Dusty	0.01
		<u> </u>	1	<u> </u>	1
Sedgwick	30	•		Very limited	
	!	•		Depth to	1.00
	!		•	saturated zone   Too sandy	  0.70
	<u> </u>	·	0.70	· •	10.70
	i		1		1
1444488:	I	l	l	l	I
Superior	50	•		Very limited	1
	!	•	11.00	· •	11.00
	!	•		saturated zone	
	!			Water erosion	11.00
		Dusty 	U.UI	Dusty 	10.01
Sedgwick	,   30	  Very limited	i	  Very limited	i
-	ĺ	_		Depth to	11.00
	I	saturated zone	I	saturated zone	1
	l	Too sandy	0.70	Too sandy	10.70
	I	Dusty	0.01	Dusty	0.01
1444400.	!	<u> </u>	!		!
1444489: Sultz	ı I 35	  Very limited	 	  Very limited	1
54162	, JS	=	1	=	11.00
	i	_	11.00	_	10.22
	i		, = 	 	
Ashwabay	25	Somewhat limited	i	Somewhat limited	i
	I	Slope	0.92	Too sandy	10.87
	I	Too sandy	0.87	l	I
	I	I	I	I	1

Table 7.—Recreation, Part II (Trail Management)—Continued

		Foot traffic an   equestrian trai		Mountain bike a   off-road vehicle t	
	map	Rating class and	Value	Rating class and	Value
	unit	limiting features	<del>                                     </del>	limiting features	<del>!</del>
1444489:	! 	! 	<u> </u>	 	i
Rubicon	20	Very limited	i	Very limited	i
	I	Too sandy	1.00	Too sandy	1.00
	I	Slope	1.00	Slope	10.22
	I	I	I	I	1
1444492:		l	!	l	!
Manistee		_		Very limited	11 00
	•	·		Too sandy   Slope	1.00  0.22
	i	l Siope	1	l Siope	1
Kellogg	30	Very limited	i	Very limited	i
33				Too sandy	11.00
	ĺ			Depth to	0.44
	I	Depth to	0.44	saturated zone	1
	I	saturated zone	I	l	1
	1	I	I	I	1
Ashwabay	:	· -		Somewhat limited	
	l .	•		Too sandy	10.87
	1	Too sandy	10.87	Slope	10.22
1444506:	! !	! !		! !	<u> </u>
Keweenaw	I 60	  Somewhat limited	i	'  Somewhat limited	i
				Too sandy	10.76
	i	i	İ	I	i
Rubicon	30	Very limited	I	Very limited	1
	I	Too sandy	1.00	Too sandy	1.00
	I	I	I	I	1
1444507:		!	!	<u> </u>	1
Keweenaw	60	•	•	Somewhat limited	1 76
	1	Too sandy	10.76	Too sandy	10.76
Rubicon	I I 30	ı IVerv limited	i	  Very limited	i
-1422-00-1				Too sandy	11.00
	İ	i -	i	i -	i
1444585:	I	I	I	l	1
Meehan, beaches	90			Very limited	1
	I	·		Depth to	1.00
	l			saturated zone	
	l .	Too sandy	11.00	Too sandy	1.00
1444586:	1	! !	!	 	1
Wurtsmith, beaches	I I 90	  Very limited		  Very limited	<u> </u>
				Too sandy	11.00
	i	,	i	 	i
1444587:	ĺ	İ	İ	l	İ
Grayling, beaches	95	Very limited	I	Very limited	1
	I	Too sandy	1.00	Too sandy	1.00
	I	<u> </u>	1	<u> </u>	1
1529830:	1 00	 	!	 	1
Meehan, beaches		•		Very limited	I I1 00
	I I	Depth to   saturated zone	11.00	Depth to   saturated zone	1.00 
	i	Too sandy	11.00	•	11.00
	i		1		1
1700372:	I	I	I	I	İ
Loxley	40	Very limited	I	Very limited	I
	I	Depth to	11.00	· -	11.00
	1	saturated zone	<u> </u>	saturated zone	1
	!	Organic matter	11.00		11.00
	1	content	11 00	content	11 00
	I	Ponding	1.00	Ponding	1.00
	1	Dusty	0.01	Dusty	0.01

Table 7.—Recreation, Part II (Trail Management)—Continued

Map unit symbol and soil name	Pct.   of	   Foot traffic an   equestrian trai	d ls	   Mountain bike a   off-road vehicle t	nd rails
	-	Rating class and limiting features	Value		Value
1700372:		 		 	1
Beseman		Depth to	11.00	Very limited   Depth to	11.00
			11.00	saturated zone   Organic matter   content	  1.00
	i			Ponding 	1.00 
Dawson		Depth to   saturated zone   Ponding	1.00    1.00	·	  1.00    1.00  0.01
1700373:	į				
Rifle		saturated zone	1.00 	Very limited   Depth to   saturated zone	•
		· -		Ponding   Dusty 	1.00  0.01
1700374: Allendale	•			  Very limited   Depth to	;      1.00
	İ	saturated zone Too sandy		saturated zone Too sandy	10.37
Wakeley		Depth to saturated zone	1.00 	  Very limited   Depth to   saturated zone	•
		Too sandy	1.00  0.30 	Ponding   Too sandy 	1.00  0.30
Kinross		  Very limited   Depth to   saturated zone	  1.00	  Very limited   Depth to   saturated zone	  1.00
		· -		Too sandy   Ponding	1.00
1702605: Menominee	    -   85			    Somewhat limited   Too sandy	      0.72
	į	-	0.72  0.72	•	
1702606: Deerton	 -  50 	  Very limited   Too sandy	    1.00	  Very limited   Too sandy	    1.00
		Large stones   content	0.50 	Large stones   content	0.50 
Brownstone	-  40   	  Very limited   Too sandy   Large stones   content		  Very limited   Too sandy   Large stones   content	  1.00  0.50
1702607: Deerton	    -   50 	    Very limited   Too sandy	1.00	·	      1.00
		Large stones   content 	0.50   	Large stones   content 	0.50   

Table 7.—Recreation, Part II (Trail Management)—Continued

	1	1		i .	
		I		l	
Map unit symbol	Pct.		Mountain bike a		
and soil name	of	equestrian tra	ils	off-road vehicle t	rails
	map	Rating class and	Value	Rating class and	Value
	unit	limiting features	1	limiting features	1
		1		1	ī
1702607:	1	I	1	l	1
Brownstone	-  40	Very limited	1	Very limited	1
	1	Too sandy	1.00	Too sandy	1.00
	1	Large stones	10.50	Large stones	0.50
	1	content	1	content	1
	1	I	1	l	1
1702608:	1	I	1	l	1
Abbaye	-  90	Somewhat limited	1	Somewhat limited	1
	1	Too sandy	10.70	Too sandy	10.70
	1	Depth to	0.44	Depth to	0.44
	1	saturated zone	1	saturated zone	1
	1	I	1	l	1
1711685:	1	I	1	l	1
Cublake	-  50	Very limited	1	Very limited	1
	1	Too sandy	11.00	Too sandy	11.00
	1	I	1	I	1
Keweenaw	-  30	Somewhat limited	1	Somewhat limited	1
	1	Too sandy	10.76	Too sandy	10.76
	1	I	1	I	1

## Table 8.-Dwellings and Small Commercial Buildings

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct.   of		ut	Dwellings with bas 	ements	Small commerci   buildings	ial
	-	Rating class and limiting features		Rating class and   limiting features		· -	
433292:	Ī	<u> </u>	Ī	   	I	   	I
Lerch	1 50	  Very limited	i	  Very limited	i	  Very limited	i
	i	·         =				Ponding	11.00
	1			Depth to		Depth to	11.00
	!	saturated zone		•	•	saturated zone	•
	!	Shrink-swell	11.00	Shrink-swell	11.00	Shrink-swell	1.00
Herbster	I -1 35	  Verv limited	i	  Very limited	1	  Very limited	1
		·         =				Depth to	11.00
	İ	saturated zone	İ	saturated zone	İ	saturated zone	Ì
	1	Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	11.00
400006	!	<u> </u>	!	<u> </u>	!		I
433296: Cublake	   35	  Somewhat limited	1	  Very limited		  Somewhat limited	1
Cubiake				Depth to	•	•	10.39
	i	saturated zone		·		saturated zone	•
	1	I	1	l	I		1
Croswell					•	Somewhat limited	
	!	Depth to   saturated zone		Depth to   saturated zone		Depth to   saturated zone	10.39
	1	Saturated zone	1	Saturated zone	1	Saturated zone	1
Ashwabay	20	Not limited	i	  Very limited	i	Not limited	i
-	İ	İ	İ	Depth to	11.00	l	İ
	I	I	1	saturated zone	•	•	1
	!		!	Shrink-swell	0.01	<u> </u>	!
433299:	1	] ]		 	1	 	1
Cublake	35	  Somewhat limited	i	  Very limited	i	  Very limited	i
	I	Depth to	10.39	Depth to	1.00	Slope	11.00
	I	saturated zone				· -	10.39
	!	Slope	10.37	Slope	10.37	saturated zone	!
Croswell	I I 20	  Somewhat limited		  Very limited	1	  Very limited	1
0100#011	1	Depth to		Depth to		Slope	11.00
	i	saturated zone		· •		·	0.39
	I	Slope	0.04	Slope	0.04	saturated zone	1
3 abasahasa	1		!		!		!
Ashwabay	1 20	Depth to		Very limited   Depth to		<del>_</del>	1
	i	saturated zone		·			10.39
	i	Slope		Slope	0.37	<del>-</del>	i
	I	I	1	Shrink-swell	0.01	l	1
422200.	1		1	<u> </u>	1		1
433300: Kellogg	I I 35	  Somewhat limited	1	  Very limited	1	  Somewhat limited	1
	33	Depth to	10.98	_	11.00		10.98
	İ	saturated zone	i	saturated zone	i	saturated zone	ĺ
	1	Shrink-swell	0.57	Shrink-swell	0.99	Shrink-swell	10.57
211		177	!		1		1
Allendale	1 25	Very limited   Depth to	  1.00	Very limited   Depth to	  1.00	Very limited   Depth to	  1.00
	1	saturated zone	1	Depth to   saturated zone	1	Depth to   saturated zone	1
	i	Shrink-swell	0.15		0.89	•	0.15
	1	I	1	I	Ι	I	1

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct.   of	basements		Dwellings with bas 		buildings	
	-	Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features	
433300:	 	 	T I	I I	 	 	I
Ashwabay	20	Not limited	1	Very limited	I	Not limited	1
	I	I	1	Depth to	1.00	l	1
	I	I	1	saturated zone	1	l	1
	I	I	1	Shrink-swell	0.01	I	1
	!	!	1	!	!	<u> </u>	1
433301:	1	l	!	l	!	l	!
Kellogg	1 40		•	Very limited		Very limited	1 00
	!	Depth to	•	•	11.00	· •	11.00
	!	saturated zone	•	•	1	· •	10.98
	!	Shrink-swell	•	•	10.99	•	10 57
	!	Slope		Slope 	10.37	Shrink-swell	10.57
Allendale	1 25	  Very limited	•	  Very limited		  Very limited	
ATTENDATE	1 23	Depth to		•		Depth to	11.00
	i	saturated zone		:	1	· -	1
	i	Shrink-swell	•	•	10.89	•	11.00
	i	Slope	0.04	•	0.04		10.15
	i	l Seeke	1	l Seeke	1		1
Ashwabav	i 20	Somewhat limited	i	Very limited	i	Very limited	i
2	i	Slope	10.37	· -	11.00	·	i1.00
	i	i	i	saturated zone		·	i
	i	i İ	i	•	0.37	•	i
	İ	İ	İ	Shrink-swell	0.01	l	İ
	I	l	1	l	I	l	1
433304:	I	I	1	I	I	l	1
Sedgwick	50	Very limited	1	Very limited	1	Very limited	1
	I	Depth to	1.00	Depth to	1.00	Depth to	1.00
	I	saturated zone	•	•	1	saturated zone	1
	1	Shrink-swell	11.00	Shrink-swell	11.00	Shrink-swell	11.00
		<u> </u>		<u> </u>	!	<u> </u>	1
Munuscong	30	•		Very limited		Very limited	1 00
	!	Ponding	1.00	•		Ponding	1.00
	!	Depth to		•	1.00	· •	1.00
	!	saturated zone   Shrink-swell	1 10.04		10 00	saturated zone   Shrink-swell	  0.04
	!	SHIIHK-SWEII	10.04	SHIIHK-SWEII	10.00	SHITHK-SWEIT	10.04
433305:	i	! 	i	I	i	! 	i
Superior	I 50	Verv limited	i	Very limited	i	Very limited	i
54501101	1	Depth to	11.00	•	11.00	_	11.00
	i	saturated zone	•	: • • · · · · · · · · · · · · · · · · ·	i - · · · ·	saturated zone	1
	i	Shrink-swell	11.00	Shrink-swell	11.00	Shrink-swell	11.00
	I	l	1	l	I	l	1
Sedgwick	30	Very limited	1	Very limited	1	Very limited	1
	I	Depth to	1.00	Depth to	1.00	Depth to	11.00
	I	saturated zone	1	saturated zone	1	saturated zone	1
	I	Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	1.00
	I	I	1	I	I	l	1
433309:		!	1	<u> </u>	1	<u> </u>	1
Superior	į 50	•		Very limited		Very limited	
	!	Depth to	11.00	•		Depth to	11.00
	1	saturated zone	•	saturated zone	•	saturated zone	I I1 00
	1	Shrink-swell	11.00		11.00		11.00
	1	Slope	10.37	Slope	10.37	Slope	11.00
Sedgwick	1 30	  Very limited	1	  Very limited	1	  Very limited	1
Jeagnier	, 50	Depth to	11.00	——————————————————————————————————————	11.00	_	11.00
	i	saturated zone		saturated zone		saturated zone	1
	i	Shrink-swell	11.00	•	11.00		11.00
	:	, 3	1	1	,	Slope	10.88
	1						

Table 8.-Dwellings and Small Commercial Buildings-Continued

	Pct.   of	Dwellings without basements	out	Dwellings with bas 	ements	Small commerci	ial
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433310:	 	 	1	] 	1	] 	1
Sultz		· -		Very limited   Slope		Very limited   Slope	11.00
Ashwabay		· -	1.00 	Very limited   Slope   Depth to   saturated zone	1.00  1.00	ĺ	  1.00 
Rubicon		· -		Shrink-swell    Very limited   Slope		    Very limited   Slope	      1.00
433314:	 	 	1	] 	I	] 	1
Manistee		Slope		Very limited   Slope   Shrink-swell	1.00	Very limited   Slope   Shrink-swell	  1.00  0.04
Kellogg		Slope   Depth to   saturated zone	1.00  0.98 	  Very limited   Slope   Depth to   saturated zone   Shrink-swell	1.00  1.00 	  Very limited   Slope   Depth to   saturated zone   Shrink-swell	  1.00  0.98    0.57
Ashwabay		  Very limited	    1.00	Very limited   Slope   Depth to   saturated zone   Shrink-swell	i I	  Very limited   Slope 	    1.00   
433326:	 	 		 	 	 	 
Rubicon	85 	Not limited 		Not limited		Not limited	1
433379: Allendale		Depth to   saturated zone	1.00 	  Very limited   Depth to   saturated zone   Shrink-swell	1.00 	  Very limited   Depth to   saturated zone   Shrink-swell	    1.00    0.15
422515	į			į		į	į
433515: Lupton				Depth to   saturated zone	11.00	saturated zone	  1.00  1.00  1.00    1.00
Cathro	30             	  Very limited   Ponding   Subsidence   Depth to   saturated zone   Organic matter   content	  1.00  1.00  1.00      1.00	Subsidence   Depth to   saturated zone	  1.00  1.00  1.00 	Subsidence	  1.00  1.00  1.00      1.00

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct.   of	basements		   Dwellings with bas 		buildings	.al
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433515:	 	 	 	 	 	 	 
Tawas	-  25	Very limited	I	Very limited	1	Very limited	1
	1	Ponding	1.00	Ponding	1.00	Ponding	1.00
	1	Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
	1	Depth to	1.00	Depth to	1.00	Depth to	11.00
	1	saturated zone	1	saturated zone	1	saturated zone	1
	 	Organic matter   content	1.00 	 	 	Organic matter   content	1.00 
433572:		 	 	 	 	 	l I
Portwing	-   50	Very limited	İ	Very limited	İ	Very limited	İ
_	1	Depth to	1.00	Depth to	1.00	Depth to	1.00
	1	saturated zone	I	saturated zone	1	saturated zone	1
	1	Shrink-swell	1.00	Shrink-swell	1.00	Shrink-swell	11.00
Herbster	- 1 30	•		Very limited		Very limited	
	!			·		Depth to	11.00
	!	saturated zone	•	•	11 00	saturated zone	11 00
		Shrink-swell 	1.00 	Shrink-swell 	1.00 	Shrink-swell 	1.00 
433573: Cornucopia	- I 80	  Very limited	 	  Somewhat limited		  Very limited	1
COINGCOPIA	1 80	·       =	•	Shrink-swell		Shrink-swell	11.00
	i		•	Slope	10.37	•	11.00
	i		1		1		
433582: Croswell	 -  82	  Somewhat limited	 	  Very limited	 	  Somewhat limited	1
0105#011	1 02	•	10.39	·	11.00		10.39
	į	saturated zone		saturated zone		saturated zone	
433599:		 	 	 	 	 	
Annalake	-  85	Not limited	I	Very limited	1	Not limited	1
	1	l	I	Depth to	1.00	I	1
	1	  -		saturated zone		  -	1
433600:	i	! 	İ	! 	i	! 	i
Annalake	-1 80	•		Very limited		Very limited	I
	1	Slope	10.37	:	11.00	Slope	11.00
	!	<u> </u>	!	•		<u> </u>	!
		 	 	Slope 	0.37 	 	 
433671: Arnheim		  Vorus limited		  Very limited	1	  Very limited	1
AIIIIeIIII	1 00	· -		· -		· -	11.00
	-	_	1.00  1.00	_	1.00  1.00	_	11.00
	i .	·	11.00	=	11.00	_	11.00
	į	saturated zone		saturated zone		saturated zone	
433676:	1	 	 	 	 	 	 
Redrim	-  85	Very limited	I	Very limited	1	Very limited	İ
	i	Depth to hard	11.00	_	11.00	_	11.00
	1	bedrock	İ	bedrock	İ	bedrock	İ
433679:	1	 		1 		1 	
Lapoin	-  85	Very limited		Very limited		Very limited	1
	1		11.00	=	11.00		11.00
	1	•	10.98			Depth to	10.98
	1	saturated zone	10.01	Shrink-swell	1.00		10.01
	1	Depth to hard	0.01	Depth to hard	11.00	Depth to hard	[0.01
	-	bedrock	10.0-	bedrock	1	bedrock	10.0-

Table 8.-Dwellings and Small Commercial Buildings-Continued

Map unit symbol and soil name	Pct.   of		ut	Dwellings with bas 	ements	Small commerci   buildings	lal
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433686:	 	] 	 	 	1	 	1
Zeba	- j 90	Very limited	i	Very limited	i	Very limited	i
		· -		——————————————————————————————————————		Depth to	11.00
	1	saturated zone	1	saturated zone	I	saturated zone	1
	1	Depth to hard   bedrock		· •	1.00 	Depth to hard   bedrock	0.20 
433729:	į	  -	į	  -	į	  -	į
Sultz	· -  85	Not limited		  Not limited		  Not limited	i
433739:	1	 	1	] 	 	] 	1
Moquah	- i 85	'  Very limited	i	  Very limited	i	  Very limited	i
		_		Flooding   Depth to		Flooding	1.00     
433771:	i .	İ	i	i	i	i	i
Beaches	-  97 	Not rated 		Not rated 	 	Not rated 	
433802:	i	İ	i	İ	i	İ	i
Udorthents, ravines	•	I	1	I	1	I	1
and escarpments	-  85 	Not rated 	 	Not rated 	 	Not rated 	 
452739:	1	I	I	I	I	I	1
Water	·  100	Not rated 	1	Not rated	 	Not rated	1
452765:	į	i	į	i	į	i .	į
Abbaye				Very limited		Somewhat limited	10.00
	-	Depth to   saturated zone		Depth to   saturated zone		Depth to   saturated zone	0.98 
	-					Depth to hard	10.61
	į	bedrock		bedrock		bedrock	
Lapoin	 -  40	  Very limited		  Very limited	 	  Very limited	
	1	Shrink-swell	1.00	Depth to	1.00	Shrink-swell	11.00
	1	Depth to	0.98	saturated zone	I	Depth to	10.98
	1	saturated zone				saturated zone	1
	 	Depth to hard   bedrock	0.01 	Depth to hard   bedrock	1.00 	Depth to hard   bedrock	0.01 
1383557:	I I	 	1	] 	] 	 	1
Au Gres	-   85	Very limited	i			  Very limited	i
	1	Depth to	1.00	Depth to	1.00	Depth to	1.00
	1	saturated zone 	1	saturated zone	 	saturated zone	1
1383580:	į		į	<u> </u>	į	<u> </u>	į
Loxley	-  40	•		Very limited		Very limited	11 00
	-	Ponding   Subsidence	1.00  1.00	•	1.00  1.00	•	1.00  1.00
	1	Depth to	11.00		11.00		11.00
	i	saturated zone	1	saturated zone	1	saturated zone	1
	i	Organic matter	11.00		11.00		11.00
	į	content	İ	content	İ	content	İ
Beseman	·  30	  Very limited		  Very limited	 	  Very limited	1
	1	Ponding	1.00	•	1.00	•	11.00
	1	Depth to	11.00	•	11.00	•	11.00
	!	saturated zone		saturated zone	11 00	saturated zone	11 00
	I	Organic matter   content	1.00 	Subsidence 	1.00 	Organic matter   content	1.00 
	i	Subsidence	11.00	i I	i	Subsidence	11.00
	1	I	1	I	I	I	1

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct. of	•	ut	Dwellings with bas 		buildings	al
	map	•		•		•	
	unit	limiting features	<del>                                     </del>	limiting features	<u> </u>	limiting features	<del>                                     </del>
1383580:	!	! 	1	! 	1	l 	1
	28	  Very limited	i	Very limited	i	Very limited	i
	i	Ponding	11.00	-	11.00	_	11.00
	İ	Subsidence	11.00	Subsidence	11.00	Subsidence	11.00
	I	Depth to	1.00	Depth to	1.00	Depth to	11.00
	I	saturated zone	1	saturated zone	I	saturated zone	1
	I	Organic matter	1.00	I	1	Organic matter	1.00
	I	content	1	I	I	content	1
1202501.	!		!		!		!
1383581: Rifle	1 90	  Very limited	1	  Very limited	!	  Very limited	1
KILIE	1 30	Ponding	11.00	•	11.00	· -	11.00
	!	Depth to	11.00	•	11.00	· -	11.00
	i	saturated zone	1	saturated zone	1	saturated zone	1
	i	Organic matter	11.00	•	11.00	•	11.00
	i	content	1	content	i - · · · ·	content	1
	İ	İ	İ	Ì	ĺ	l	İ
1383603:	I	I	1	I	I	I	1
Cornucopia	80	•		Very limited		Very limited	1
	!	Slope	1.00	•	11.00	•	11.00
	!	Shrink-swell	1.00	Shrink-swell	0.99	Shrink-swell	11.00
1383658:	!	l I	1	! !	!	<b>i</b>	1
	i i 50	  Somewhat limited	i	  Very limited	i	  Somewhat limited	i
	i	Depth to hard	0.01	•	1.00	•	0.01
	i	bedrock	i	bedrock	į	bedrock	i
	I	l	1	I	I	l	1
Brownstone	40	•		Very limited		Somewhat limited	1
	!	Large stones	10.39	•	11.00		10.39
	!	Depth to hard	10.35	•	1	Depth to hard	10.35
	!	bedrock	1	Large stones	10.39	bedrock	!
1383660:	i	! 	i	! !	<u> </u>	 	i
Deerton	50	Somewhat limited	i	Very limited	i	Very limited	i
	İ	Slope	10.37	Depth to hard	11.00	Slope	11.00
	I	Depth to hard	0.01	bedrock	I	Depth to hard	0.01
	I	bedrock	1	Slope	0.37	bedrock	1
B	1		!	 	!		!
Brownstone	1 40	Somewhat limited   Large stones	I  0.39	Very limited   Depth to hard	  1.00	Very limited   Slope	1
	!	Slope	10.39	•		Large stones	10.39
	i	Depth to hard	10.35	•	0.39	•	10.35
	i	bedrock	1	Slope	10.37	· •	1
	I	I	1	I -	I	l	1
1383662:	1	1	1	<u> </u>	1	<u>.</u>	1
Abbaye	1 90	Somewhat limited	•	Very limited		Very limited	
	!	Depth to	10.98	•	11.00	·	1.00
	!	saturated zone	10.46	saturated zone	11 00	Depth to	10.98
	1	Depth to hard   bedrock	10.46	•	1.00	saturated zone   Depth to hard	10 46
	!	Slope	1  0.37	bedrock   Slope	1  0.37	· •	10.46
	i		1		U.S.		i
1383665:	İ	İ	i	İ	į	İ	ĺ
Allendale	35	Very limited	1	Very limited	I	Very limited	1
	I	Depth to	1.00		1.00	· •	1.00
	1	saturated zone   Shrink-swell	  0.15	saturated zone   Shrink-swell	l 10.89	saturated zone   Shrink-swell	  0.15

Table 8.-Dwellings and Small Commercial Buildings-Continued

and soil name	Pct.  Of	basements		   Dwellings with bas 		buildings	
		Rating class and   limiting features	•	Rating class and   limiting features	•	Rating class and   limiting features	
1383665: Wakeley	     30 	Ponding	11.00	•	      1.00  1.00	•	      1.00  1.00
Kinross	       20	saturated zone Shrink-swell	  0.57 	saturated zone   Shrink-swell 	  0.99 	· •	  0.57 
	     	•	11.00	-	11.00	Ponding   Depth to   saturated zone 	1.00  1.00 
1383960: Flink	   75     	-	11.00	: • • · · · · · · · · · · · · · · · · ·	    1.00   	  Very limited   Depth to   saturated zone 	    1.00 
1444357: Arnheim	   85       	Ponding   Flooding	1.00  1.00  1.00	Ponding   Flooding   Depth to	1.00  1.00	•	  1.00  1.00  1.00
1444359: Beaches	     97	    Not rated 		    Not rated 	 	    Not rated 	
1444367: Udorthents, ravines and escarpments		      Not rated 	 	      Not rated 	 	      Not rated 	       
1444378: Wakefield	   85     	-	11.00	  Very limited   Depth to   saturated zone 	11.00	  Very limited   Depth to   saturated zone 	    1.00 
1444379: Wakefield	   85     	Depth to   saturated zone	11.00	•	11.00	saturated zone	  1.00    1.00
1444388: Allendale	   80     	  Very limited   Depth to   saturated zone   Shrink-swell	    1.00    0.15	saturated zone	    1.00    0.89	saturated zone	    1.00    0.15
1444402: Tonkey	   90       	  -  Very limited   Ponding   Depth to   saturated zone 	    1.00  1.00	-		  Very limited   Ponding   Depth to   saturated zone	    1.00  1.00
1444410: Tula	   80     	  Very limited   Depth to   saturated zone 	    1.00 	  Very limited   Depth to   saturated zone 	    1.00 	  Very limited   Depth to   saturated zone 	    1.00 

Table 8.—Dwellings and Small Commercial Buildings—Continued

Map unit symbol and soil name	Pct.   of	basements		   Dwellings with bas 		buildings	
	map  unit	Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features	•
1444414:	1	] 	I	 	 	 	I
Lupton	40	Very limited	İ	Very limited	İ	Very limited	i
-	i	Ponding	11.00	Ponding	11.00	Ponding	11.00
	i	Subsidence	11.00	Subsidence	11.00	_	11.00
	1	Depth to	11.00	Depth to	1.00	Depth to	1.00
	1	saturated zone	I	saturated zone	I	saturated zone	1
	1	Organic matter	11.00	Organic matter	1.00	Organic matter	11.00
	1	content	1	content	1	content	!
Cathro	30	  Very limited	i	  Very limited	i	  Very limited	i
	1	Ponding	1.00	Ponding	1.00	Ponding	1.00
	1	Subsidence	1.00	Subsidence	1.00	Subsidence	1.00
	1	Depth to	1.00	Depth to	1.00	Depth to	1.00
	1	saturated zone	1	saturated zone	1	saturated zone	1
	1	Organic matter	11.00	I	1	Organic matter	11.00
		content	1	 		content	
Tawas	25	  Very limited		  Very limited		  Very limited	i
	1	Ponding	1.00	•	1.00	•	1.00
	1	Subsidence	11.00		1.00	•	11.00
	1	Depth to	1.00	•	1.00	•	1.00
	1	saturated zone		saturated zone	1	saturated zone	
		Organic matter   content	1.00 	 	!	Organic matter   content	1.00 
1444425:	i	 	i	l I	İ	l	i
Lerch	·  50	· -		Very limited		Very limited	1
	1	Ponding	11.00	·	11.00	•	11.00
	1	Depth to	11.00	•	11.00	· •	11.00
		saturated zone   Shrink-swell	  1.00	saturated zone   Shrink-swell	  1.00	saturated zone   Shrink-swell	  1.00
		l	!	l	!	l	!
Herbster	. 35	•		Very limited		Very limited	11 00
	!	Depth to	1.00	•	11.00	· •	11.00
	!	saturated zone   Shrink-swell	11.00	saturated zone   Shrink-swell	  1.00	saturated zone   Shrink-swell	1
	i	SHITHK SWELL	1	SHITHK SWEIL	1	SHITHK SWELL	1
1444426:		  Very limited	1	  Very limited	!	  Very limited	!
Portwing	1 20	Depth to	  1.00		11.00	• •	11.00
	1	saturated zone	1	saturated zone	11.00 I	bepth to   saturated zone	1
	1	Shrink-swell	11.00		11.00		11.00
	i	SHITING SWELL	1	Onlink Swell	1	DITTING SWELL	1
Herbster	·  30	Very limited	1	Very limited	1	Very limited	1
	1	Depth to	1.00	Depth to	1.00	Depth to	1.00
	I	saturated zone	1	saturated zone	1	saturated zone	1
		Shrink-swell	1.00 	Shrink-swell	1.00 	Shrink-swell	1.00 
1444427:	i	İ	i	İ	i	İ	i
Cornucopia	·  80	· -	1	Somewhat limited		Very limited	1
	1	Shrink-swell	1.00	•	0.99		1.00
		Slope	10.37	Slope	10.37	Slope	11.00
1444428:		 		i I		i I	
Cornucopia	- I 80	Very limited	I	Very limited	1	Very limited	1
	1	Slope	11.00	Slope	1.00	Slope	11.00
	1	Shrink-swell	11.00	Shrink-swell	0.99	Shrink-swell	11.00
1444431:	1	 	1	 	1	 	1
Croswell	82	  Somewhat limited	i	  Very limited	1	  Somewhat limited	
	. J2	Depth to	0.39		1.00		10.39
	:	saturated zone	1	saturated zone	• •	saturated zone	
	1	Saturated zone		Saturated Zone	1	Sacuraceu Zone	1

Table 8.-Dwellings and Small Commercial Buildings-Continued

Map unit symbol and soil name	Pct.   of		ut	Dwellings with bas		buildings	ial
		Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444432: Gogebic	  -   85   	•	11.00	    Very limited   Depth to   saturated zone	      1.00	    Very limited   Depth to   saturated zone	      1.00
1444435: Iosco	  -  85   	-	    1.00	  Very limited   Depth to   saturated zone	    1.00	  Very limited   Depth to   saturated zone	    1.00
1444457: Redrim	  -   85   	•	      1.00	    Very limited   Depth to hard   bedrock	      1.00	    Very limited   Depth to hard   bedrock	      1.00
1444459: Zeba	  -   90       	  Very limited   Depth to   saturated zone   Depth to hard   bedrock	    1.00    0.20	saturated zone	1.00 	  Very limited   Depth to   saturated zone   Depth to hard   bedrock	    1.00    0.20
1444460: Abbaye	  -   55       	Depth to saturated zone	0.98 	  Very limited   Depth to   saturated zone   Depth to hard   bedrock	1.00 	  Somewhat limited   Depth to   saturated zone   Depth to hard   bedrock	      0.98    0.61
Lapoin	 -  40       	Shrink-swell   Depth to	1.00  0.98	saturated zone   Shrink-swell	1.00    1.00	Depth to	  1.00  0.98    0.01
1444461: Abbaye	  -  55       	Depth to saturated zone	    0.98    0.61	saturated zone	1.00 	  Somewhat limited   Depth to   saturated zone   Depth to hard   bedrock	    0.98    0.61
Zeba	 -  40       	  Very limited   Depth to   saturated zone   Depth to hard   bedrock	  1.00    0.20 	saturated zone		  Very limited   Depth to   saturated zone   Depth to hard   bedrock	  1.00    0.20 
1444477: Cublake	  -  35   	  Somewhat limited   Depth to   saturated zone	      0.39	  Very limited   Depth to   saturated zone		  Somewhat limited   Depth to   saturated zone	      0.39
Croswell	-  20   	  Somewhat limited   Depth to   saturated zone	    0.39	  Very limited   Depth to   saturated zone	•	  Somewhat limited   Depth to   saturated zone	10.39
Ashwabay	 -  20       	  Not limited       	         	  Very limited   Depth to   saturated zone   Shrink-swell 	1.00    0.01	Ì	       

Table 8.—Dwellings and Small Commercial Buildings—Continued

and soil name	Pct. of	basements		Dwellings with bas 		buildings	
	_	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	•
	!	!	İ	<u> </u>	<u> </u>	! !	Ī
1444478:			!		!		1
Cublake	1 35	•		Very limited   Depth to		Very limited   Slope	11.00
	! !	· •		Depth to   saturated zone		·	10.39
!	! 	•	•	•	10.37	•	
			Į.	<u> </u>	Į.	<u> </u>	1
Croswell	20			·		Very limited	1 00
	!			Depth to   saturated zone	1.00 	•	1.00  0.39
	! 	saturated zone   Slope			10.04	·	•
į	İ		İ	<u> </u>	İ	İ	İ
Ashwabay	20			Very limited		Very limited	
	!	-		·         =		Slope	11.00
	!	saturated zone	•	•	10 27	•	10.39
	!	Slope	10.37	•	10.37	•	!
!	 		<u> </u>	Shrink-swell 	0.01 	! 	<u> </u>
1444479:	İ	l	İ	l	İ	l	İ
Morganlake	85			Very limited		Somewhat limited	
!	!			· •	11.00	•	10.98
	!	saturated zone	!	•	10.01	saturated zone	!
!	 		<u> </u>	Shrink-swell 	0.01 	! 	<u> </u>
1444480:	İ	İ	İ	i I	İ	İ	i
Morganlake	85	•	•	Very limited		Very limited	1
	!	•	•	· •	11.00	•	1.00
	!	saturated zone	•	saturated zone	  0.37		10.98
	 	Slope 	0.37 	-	0.37		
	l	<u> </u>	1	<u>!</u>	Į.	<u>!</u>	1
1444481:     Kellogg	l I 35	  Somewhat limited	1	  Very limited		  Somewhat limited	1
	 I			Depth to		Depth to	10.98
ı	i	•	•	saturated zone	•	· •	i
Ī	ĺ	Shrink-swell	10.57	Shrink-swell	0.99	Shrink-swell	10.57
  Allendale	   25	  Very limited	 	  Very limited	1	  Very limited	1
TITTE TOTAL	1 23			Depth to		Depth to	11.00
j	i	saturated zone	1	saturated zone	1	saturated zone	1
1	İ	•	0.15	Shrink-swell	0.89	Shrink-swell	0.15
  Ashwabay	l 20	  Not limited	1	  Very limited	1	  Not limited	
Asiiwabay	1 20	l	i	·	11.00		i .
j	i		i	saturated zone	1	i I	i
	i	İ	i	Shrink-swell	0.01	İ	i
1444482:	 	 	1	] !		] !	1
Kellogg	40	  Somewhat limited	i	  Very limited	i	  Very limited	1
	I		0.98	·	11.00	_	11.00
Ī	I	saturated zone	•	saturated zone	I	Depth to	10.98
!	l		0.57		0.99		1
!	  -	Slope	0.37	Slope	0.37	Shrink-swell	10.57
Allendale	ı   25	  Very limited		  Very limited		  Very limited	1
i	I		11.00	_	11.00	•	11.00
	1	saturated zone	1	saturated zone	1	saturated zone	1
i i	1	Dataratea rone				,	•
i I	İ	•	0.15		0.89		11.00

Table 8.-Dwellings and Small Commercial Buildings-Continued

Map unit symbol and soil name	Pct.   of		ut	Dwellings with bas 	ements	Small commerci   buildings	ial
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444482:	Ī		Ī	<u> </u>	Ī	<u> </u>	I
Ashwabay	1 20	l Isomowhat limited	!	  Very limited		  Very limited	-
ASIIWaDay	1 20	•	10.37	·	11.00	•	11.00
	!	Slope	10.37	· •	•	Slope	11.00
	!		!	saturated zone	10 27	!	!
	!	1	!	Slope   Shrink-swell	10.37	•	!
	!		!	Shrink-swell	0.01	! :	!
1444486:	!	l I	!	] 	!	! !	-
Sedgwick	i 50	ı  Verv limited	i	  Very limited	i	  Very limited	i
beagwick	1 30	Depth to	11.00	·	11.00	• •	11.00
	:	saturated zone	1	saturated zone	1	saturated zone	11.00
		Shrink-swell	11.00	•	11.00	•	11.00
	-	SHITHK-SWEIT	11.00	SHITHK-SWEIL	11.00	SHITHK-SWELL	11.00
Munuscong	1 30	ı  Verv limited	i	  Very limited	i	  Very limited	i .
nanascong	1	Ponding	11.00	·	11.00	•	11.00
	;	Depth to	11.00		11.00	•	11.00
	:	saturated zone	1	saturated zone	1	saturated zone	1
	:	Saturated Zone   Shrink-swell	10.04	•	10.80		10.04
	-	SHITHK-SWEIT	10.04	SHITHK-SWEIL	10.00	SHITHK-SWELL	10.04
1444487:	-	! !	!	! !		! !	
Superior	1 50	  Very limited	:	  Very limited		  Very limited	
Superior	1 30	Depth to	11.00	·	11.00	•	11.00
	!	Depth to   saturated zone	11.00	· •	11.00		11.00
	!		11 00	saturated zone	1 00	saturated zone	11 00
	!	Shrink-swell	11.00	Shrink-swell	1.00	Shrink-swell	1.00
Sedgwick	1 30	l Worr limited	!	l Nort limited	!	  Vor: limited	!
seagwick	1 30	·		Very limited		Very limited	11 00
	!	Depth to		Depth to	11.00	Depth to	1.00
	!	saturated zone	•	saturated zone	1 00	saturated zone	1 00
	!	Shrink-swell	11.00	Shrink-swell	1.00	Shrink-swell	1.00
1444488:	!	l I	!	] 	!	! !	!
Superior	1 50	  Very limited	!	  Very limited		  Very limited	
Superior	1 30	Depth to	11.00	·	11.00	•	11.00
	!	saturated zone	11.00	saturated zone	11.00	saturated zone	11.00
	:	Saturated Zone   Shrink-swell	11.00	•	11.00	•	11.00
	:	Slope	10.37	•	10.37	•	11.00
	:	i I grobe	10.37	ı siope	10.37	, slope	11.00
Sedgwick	1 30	  Very limited	1	  Very limited	<u> </u>	  Very limited	<u> </u>
beagnien	1	Depth to	11.00	·	1.00	• •	11.00
	;	saturated zone	1	saturated zone	1	saturated zone	1
	;	Shrink-swell	11.00	•	11.00	•	11.00
	i .	l SHIIH SWEII	1	l SHITHK SWELL	1	Slope	10.88
	i		i		i	510 <u>6</u> 6	1
1444489:	i		i	i I	i	I	i
Sultz	i 35	Verv limited	i	Very limited		Very limited	i
	i	Slope		Slope		Slope	11.00
	i		i		i	l	1
Ashwabay	i 25	Verv limited	i	Very limited	i	Very limited	i
	i	Slope	11.00	_		Slope	11.00
	i	<u> </u>		Depth to	11.00		i
	i		i	saturated zone	:	i	i
	i		i	Shrink-swell	0.01		í
	İ		i		i	· I	í
Rubicon	20	Very limited	I	Very limited	I	Very limited	i
	i	Slope	11.00	_		Slope	11.00
	İ		i	i -	i	i	i
1444492:	I		I	I	I	I	İ
Manistee	40	Very limited	I	Very limited	I	Very limited	1
	I	Slope	11.00	_		Slope	11.00
		-		-	0.80	·	
	1	Shrink-swell	10.04	Shrink-swell	10.00	Suring-Swell	10.04

Table 8.—Dwellings and Small Commercial Buildings—Continued

	Pct.   of	basements		Dwellings with bas		buildings	
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	•
1444492:	I I	] 	 	 	I	] 	1
Kellogg	I 30	Very limited	i	Very limited	i	Very limited	i
33	i	Slope	11.00	•	11.00	·	11.00
	i	Depth to	0.98	Depth to	11.00	Depth to	0.98
	İ	saturated zone	i	saturated zone	İ	saturated zone	İ
	I	Shrink-swell	10.57	Shrink-swell	10.99	Shrink-swell	10.57
Ashwabay	l I 20	  Very limited	!	  Very limited	1	  Very limited	!
nsiiwabay	1 20	Slope	11.00	· -	11.00		11.00
	i	l STOPE	1	Depth to	11.00	•	1
	i	i	i	saturated zone	1	I	i
	i	i İ	i	Shrink-swell	0.01	i I	i
1444506	1	!	!	!	1	  -	!
1444506: Keweenaw	l I 60	  Not limited	!	  Not limited	1	  Not limited	!
1/G#GGIIA#	00		i		İ	 	i
Rubicon	30	Not limited	!	Not limited	!	Not limited	!
1444507:	 	 	1	 	1	 	
Keweenaw	I 60	'  Somewhat limited	i	  Somewhat limited	i	  Very limited	i
	İ	Slope	0.16		0.16	· -	11.00
B. 1.1		10	!	10	1		!
Rubicon	1 30	Slope	  0.37	Somewhat limited   Slope	I  0.37	Very limited   Slope	1
	 	STOPE	10.37	stobe	10.37	STOPE	11.00
1444585:	i	į	i	İ	i	İ	i
Meehan, beaches	90	Very limited	1	Very limited	1	Very limited	1
	1	Depth to	1.00	Depth to	1.00	Depth to	1.00
		saturated zone	!	saturated zone	1	saturated zone	1
1444586:	 	! 	i	! 	i	! 	1
Wurtsmith, beaches	90	Somewhat limited	İ	Very limited	Ì	Somewhat limited	İ
	I	Depth to	10.39	Depth to	1.00	Depth to	10.39
	ļ.	saturated zone	1	saturated zone	1	saturated zone	1
1444587:	 	 	!	 	1	 	
Grayling, beaches	,   95	'  Not limited	i	Not limited	i	  Somewhat limited	i
<u> </u>	İ	İ	i	İ	i	Slope	0.88
1500000		<u> </u>	!	<u> </u>	1	<u> </u>	!
1529830: Meehan, beaches	I I 90	  Very limited	i	  Very limited	1	  Very limited	;
neenan, beaches	1	Depth to	11.00	•	11.00	· -	11.00
	i	saturated zone	1	saturated zone	1	saturated zone	1
4 500050	1	!	!	!	1	  -	!
1700372: Loxley	I I 40	  Very limited	1	  Very limited	1	  Very limited	
	, 20 I	Ponding	11.00		11.00	·	11.00
	i	Subsidence	11.00	•	11.00	•	11.00
	i	Depth to	11.00	•	11.00	•	11.00
	i	saturated zone		saturated zone	1	saturated zone	1
	İ	Organic matter	11.00	•	11.00	•	11.00
	ĺ	content	İ	content	İ	content	İ
	1 3U	  Very limited	1	  Very limited	1	  Very limited	1
Beseman	, 50	Ponding	11.00	•	11.00	·	11.00
Beseman	1		•		•		•
Beseman	 	l Depth to	11.00	I Depth to	1 1 . 00	l Depth to	11.00
Beseman	   	Depth to   saturated zone	1.00 	Depth to   saturated zone	1.00 	Depth to   saturated zone	1.00 
Beseman	     	· -	1.00    1.00	saturated zone	1.00    1.00	saturated zone	1.00    1.00
Beseman	       	saturated zone	İ	saturated zone	İ	saturated zone	İ

Table 8.-Dwellings and Small Commercial Buildings-Continued

Map unit symbol and soil name	Pct.   of	basements		Dwellings with bas 		buildings	
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
	1		<del>i</del>	l	i	l	<del>i                                     </del>
1700372:			!	<u> </u>	!	<u> </u>	1
Dawson	28	<del>-</del>		•		Very limited	
	!	•	11.00	•	1.00		1.00
	!		11.00		1.00	•	1.00
	!		11.00		•		11.00
	!	saturated zone	•		!	•	11.00
		Organic matter content	I . 00	I 		Organic matter   content	1.00 
1700373:	1	] 	1	 	1	 	1
Rifle	90	  Verv limited	i	  Very limited	i	  Very limited	i
	i	<del>-</del>		·	1.00	•	11.00
	i	-		-	•		11.00
	i	saturated zone		·	i	· •	i
	i	Organic matter	11.00	Organic matter	11.00	Organic matter	11.00
	İ	content	İ	content	İ	content	İ
1700374:		 		 	 	 	
Allendale	35	Very limited	1	Very limited	1	Very limited	1
	1	Depth to	1.00	Depth to	1.00	Depth to	11.00
	1	saturated zone		saturated zone	•	saturated zone	1
		Shrink-swell	0.15	Shrink-swell	0.89	Shrink-swell	0.15
Wakeley	30		i	  Very limited	i	  Very limited	i
	1				1.00	Ponding	1.00
	1	<del>-</del>		· •	•	Depth to	1.00
		saturated zone Shrink-swell	•	saturated zone   Shrink-swell	•	saturated zone   Shrink-swell	l 10.57
	i		İ	İ	İ	İ	1
Kinross	20	· -		·		Very limited	1
	!	-		-			11.00
	!	<del>-</del>		· -		Depth to	11.00
		saturated zone	 	saturated zone 	l I	saturated zone 	1
1702605: Menominee		   	İ	 	İ	 	İ
Menominee	.1 92	· -		•		Very limited	11.00
		Slope 	I	Slope 	11.00	Slope 	1
1702606: Deerton	50	  Comowhat limited	1	  Very limited		  Somewhat limited	1
Deer con	1 20		0.01		•	Depth to hard	10.01
	i	bedrock	U.UI	bedrock	1	bedrock	1
Brownstone	1 40	  Somewhat limited	1	  Very limited	 	  Somewhat limited	l I
220	1	Large stones	0.39	_	11.00		0.39
	i	Depth to hard	10.35	·         =	1	Depth to hard	10.35
	į	bedrock		Large stones	0.39	·	
1702607:			 	 	 	 	1
Deerton	50	Somewhat limited	I	Very limited	I	Very limited	1
	I	Slope	10.37	_	11.00	_	11.00
	1	Depth to hard	0.01	bedrock	I	Depth to hard	10.01
		bedrock	I	Slope	0.37 	bedrock	1
Brownstone	40	Somewhat limited		Very limited		  Very limited	i
	I	Large stones	10.39	=	1.00	_	11.00
	I	Slope	10.37		1	Large stones	10.39
	!	Depth to hard	10.35		10.39	_	10.35
		bedrock		Slope	0.37	bedrock	

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Table 8.—Dwellings and Small Commercial Buildings—Continued

		<u> </u>		<u> </u>		<u> </u>	
Map unit symbol	Pct.	Dwellings witho	ut	Dwellings with ba	sements	Small commerc:	ial
and soil name	of	basements		1		buildings	
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	1	limiting features	1	limiting features	1
	1	T	ī	1	1	I	ī
1702608:	1	l	1	1	1	I	1
Abbaye	-  90	Somewhat limited	1	Very limited	1	Very limited	1
	1	Depth to	10.98	Depth to	1.00	Slope	1.00
	1	saturated zone	1	saturated zone	1	Depth to	0.98
	1	Depth to hard	10.46	Depth to hard	1.00	saturated zone	1
	1	bedrock	1	bedrock	1	Depth to hard	0.46
	1	Slope	10.37	Slope	10.37	bedrock	1
	1	I	1	1	1	I	1
1711685:	1	I	1	1	1	I	1
Cublake	-  50	Somewhat limited	1	Very limited	1	Somewhat limited	1
	1	Depth to	10.39	Depth to	1.00	Depth to	10.39
	1	saturated zone	1	saturated zone	1	saturated zone	1
	1	l	1	1	1	I	1
Keweenaw	-  30	Not limited	1	Not limited	1	Not limited	1
	1	l	1	1	1	I	1

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

	Pct.		d	Shallow excavation	ons	Landscaping	
	of	·	177.7	l Delian de	177.7	l Deline	177.7
	-	-		Rating class and   limiting features		-	
433292 :	<u> </u>		<u> </u>	<u> </u>	ļ		<u> </u>
		  Very limited	!	  Trans. limited	!	 	!
re.cu		-			  1.00	Very limited   Ponding	11.00
	!			-	11.00		11.00
		•	•	saturated zone		·	11.00
				Too clayey		· -	•
	;				10.46		i
	i			excavation walls		· 	i
		•	Į.	•	ļ .	l	1
Herbster	35	-		• •		Very limited	
	!	-			•	Depth to	11.00
	!			saturated zone		saturated zone	!
	!				0.28	•	!
	!			Unstable   excavation walls	0.01	] i	!
	!	Frost action	10.50	excavation walls	! !	 	!
433296:		! !	1	! !	! !	l I	-
Cublake	I I 35	I Isomewhat limited	i	  Very limited	! 	  Somewhat limited	-
Cubiake	1 33			· -	•	Droughty	10.53
	i	saturated zone		saturated zone	•		10.50
	i	l sacaracea rone	i		0.15		10.19
	i	İ	i	excavation walls	•	saturated zone	1
Croswell		  Companies limited	1	  Very limited	l	  Somewhat limited	1
Croswell	1 20	•		· -	•	Droughty	10.56
	!	Depth to   saturated zone		saturated zone		·	10.50
		saturated zone	•			Depth to	10.19
	<u> </u>	 	i	excavation walls	•	saturated zone	
		<u> </u>	Į.	<u> </u>	ļ .	l	!
Ashwabay	20	Not limited	!		•	Somewhat limited	
	!	  -	!	· -		Droughty	10.34
	!		!	saturated zone		<u> </u>	!
	!		!	·	0.50  0.01		!
			1	onstable   excavation walls	•	I I	1
	i		i		i	· 	i
433299:			I	<u> </u>	I	<u>.</u>	1
Cublake	35			· -		Somewhat limited	1
	1	-		· -		Droughty	10.53
	!	•	10.19	•	•		10.50
	!	saturated zone	!	-	10.37	·	10.37
	!		!	•	0.15	· •	0.19
	 	 	1	excavation walls	! 	saturated zone 	
Croswell	20			· -	•	  Somewhat limited	i
	I	Depth to	0.19	Depth to	1.00	Droughty	10.56
	I	saturated zone		saturated zone		· -	10.50
	I	Slope	0.04	Unstable	1.00	Depth to	0.19
	1	ı	1	1	1		1
	ı	l	1	excavation walls   Slope	1  0.04	saturated zone   Slope	10.04

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

	Pct. Of	•	ıd	Shallow excavati 	ons	Landscaping 	
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	•
	I	l IIMICING TEACUTES	<del></del>	IIMICING TEACUTES	<u>'</u>	I IIMICING TEACUTES	<del>'</del>
433299:	i	I	i	İ	i	İ	i
Ashwabay	20	Somewhat limited	1	Very limited	I	Somewhat limited	1
	I	Slope	0.37	Depth to	1.00	Slope	10.37
	I	Depth to	0.19	•		Droughty	10.34
	I	saturated zone	I			Depth to	0.19
	!	!	!	•	10.37	•	
	!	<u> </u>	!	•	0.01	!	!
	!	 	!	excavation walls	1	] 	!
433300:	:	! !		! !	! !	! !	<u> </u>
Kellogg	i 35	'  Somewhat limited	i	Very limited	i	Somewhat limited	i
	i	Depth to	0.75	•	•	Depth to	10.75
	i	saturated zone	i	saturated zone		· -	i
	I	Shrink-swell	10.57	Too clayey	0.32	l	1
	I	I	1	Unstable	0.02	I	1
	I	l	I	excavation walls	I	l	1
		<u> </u>	!	<u> </u>	1	<u> </u>	1
Allendale	25	•		•		Very limited	1 00
	!	Depth to   saturated zone		Depth to   saturated zone		Depth to   saturated zone	1.00 
	!	Saturated Zone   Frost action	l 10.50		•	Droughty	10.13
	i .	Shrink-swell	10.15		10.01	• • •	10.13
	i		1	excavation walls	•	! 	i
	İ	İ	İ	İ	ĺ	İ	İ
Ashwabay	20	Not limited	I	• •		Somewhat limited	1
	1	<u> </u>	1			Droughty	10.34
	!	!	!			!	!
	!	!	!		0.50  0.01	•	
	 	! 	<u> </u>	onstable   excavation walls	•	! 	<u> </u>
	i	I	i		i	İ	i
433301:	Ι.,	l	I	I	I	l	1
Kellogg	40			Very limited	•	Somewhat limited	
	!	Depth to	10.75		11.00	Depth to	10.75
	!	saturated zone   Shrink-swell	10.57	saturated zone   Slope	I  0.37	saturated zone   Slope	  0.37
	!	Slope	10.37	=	10.37	•	10.37
	i .	l slope	10.57	• • •	10.02	•	i .
	i	i I	i	excavation walls	•	i I	i
	I	l	1	I	I	I	1
Allendale	25	• •		•		Very limited	1
	!	Depth to		•		Depth to	11.00
	!	saturated zone	·	saturated zone	•	saturated zone	10 12
	!	Frost action   Shrink-swell	10.50			Droughty	0.13  0.04
	!	Slope	0.15  0.04	=	0.04  0.01	<del>-</del>	10.04
	i	Siobe	10.04	excavation walls		! 	i
	I	l	I	Ī	I	I	1
Ashwabay	20	Somewhat limited				Somewhat limited	1
	1	Slope	10.37		11.00	·	10.37
	!	<u> </u>	Į.			• • •	10.34
	!	 	!		10.50		1
	1	 	1	=	10.37		1
	1	] 	1	Unstable   excavation walls	0.01	] 	1
	1	I	1	excavation walls	I	I	1

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct. Of	•	d	Shallow excavation	ons	Landscaping 	
	map	Rating class and	Value	Rating class and			
	unit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	1
433304:	!		!				!
Sedgwick	I 50	l  Verv limited	i	  Very limited	! 	  Very limited	;
beagwien	1	Depth to		_		Depth to	11.00
	i	saturated zone		·		•	1
	i	Shrink-swell	11.00	Too clayey	0.50	Dusty	0.01
	I	Frost action	11.00	Unstable	0.29	I	1
	I	Low strength	1.00	excavation walls	I	I	1
	1	ļ.	1	Dusty	0.01	1	1
		1	!	l	!		!
Munuscong	1 30	•		Very limited		Very limited	1 00
	!	Ponding		-		Ponding	11.00
	!	Depth to   saturated zone	1.00	·	1.00 	Depth to   saturated zone	1.00 
	!	Frost action	11.00		•	Dusty	10.01
	i	Shrink-swell	10.04		0.01	•	1
	i	1	1	excavation walls	•	i	i
	i	İ	i	Dusty	0.01	i	i
	İ	Ì	İ	<u>-</u> I	İ	Ì	İ
433305:	I	I	1	I	I	I	1
Superior	50	•		· •		Very limited	1
	I	Depth to		· •	•	Depth to	1.00
	!	saturated zone	•	saturated zone		saturated zone	
	!	Shrink-swell	11.00	·	11.00	•	[0.01
	!	Low strength   Frost action	1.00  0.50		10.33	1	1
	!	FIOST ACCION	10.50	•	1  0.01	! !	1
	i	i i	i	l Dascy	0.0±	i i	i
Sedgwick	30	Very limited	i	Very limited	i	Very limited	i
-	İ	Depth to	11.00	_		Depth to	11.00
	I	saturated zone	1	saturated zone	I	saturated zone	1
	I	Shrink-swell	11.00	Too clayey	0.50	Dusty	0.01
	I	Frost action	11.00		0.29	I	I
	!	Low strength	11.00	•	•	!	!
	!	1	1	Dusty	0.01	 	1
433309:	:	! !	<u> </u>	! !	! !	<u> </u>	<u> </u>
Superior	I 50	Very limited	i	Very limited	i	Very limited	i
-	İ	Depth to			11.00	Depth to	11.00
	I	saturated zone	I	saturated zone	I	saturated zone	1
	I	Shrink-swell	1.00	Too clayey	1.00	Slope	10.37
	I	Low strength	11.00	· -	0.37	•	0.01
	!	Frost action	10.50	•	0.33	!	1
	!	Slope	10.37			!	!
	!	! !	!	Dusty 	0.01	 	!
Sedgwick	1 30	  Verv limited	i	  Very limited	<u>.</u>	  Very limited	i
	i	Depth to		· •		Depth to	11.00
	i	saturated zone	i	=	İ	· -	i
	I	Shrink-swell	11.00		0.50	Dusty	0.01
	I	Frost action	11.00	Unstable	0.29	I	1
	I	Low strength	11.00			I	1
	!	!	!	Dusty	0.01	!	!
422210.	1		1	  -	I		!
433310:	l 25	  Very limited	1	  Very limited	I	  Town limited	1
Sultz	1 33 1	Slope	1	· •		Very limited   Slope	1 1.00
	i	STOPE	1	•	10.73	_	10.01
	i	i i	i	excavation walls			1
		•	•		•	•	

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	of	·		   Shallow excavation 		   Landscaping 	
	_	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433310: Ashwabay	•	· -	    1.00         	Slope   Depth to   saturated zone   Too clayey	1.00  1.00      0.50  0.01	i I	    1.00  0.34   
Rubicon	 -  20   	· -		-	1.00  1.00	Slope	  1.00  0.93  0.50
433314: Manistee	  -   40     	Slope	    1.00  0.04 	Too clayey	1.00  0.28  0.01	•	    1.00  0.50  0.13
Kellogg	  -  30           	Slope	1.00  0.75 	Depth to   saturated zone   Too clayey	1.00  1.00      0.32  0.02	Slope   Depth to   saturated zone 	  1.00  0.75     
Ashwabay	  -  20           	· -	  1.00         	Depth to   saturated zone   Too clayey	1.00  1.00      0.50  0.01	Slope   Droughty   	  1.00  0.34   
433326: Rubicon	  -   85   	    Not limited   	       	•	11.00	    Somewhat limited   Droughty   Too sandy	      0.67  0.50
433379: Allendale	  -  80         	  Very limited   Depth to   saturated zone   Frost action   Shrink-swell	  1.00    0.50  0.15	saturated zone Too clayey	1.00    0.50  0.01	saturated zone Droughty	  1.00    0.13
433515: Lupton	  -  40   	  Very limited   Ponding   Depth to   saturated zone   Subsidence   Frost action 	   1	Depth to   saturated zone   Organic matter   content   Unstable   excavation walls	1.00  1.00    1.00  1.00 	Organic matter content Depth to saturated zone Dusty	      1.00  1.00    1.00    0.01 

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.   of	streets		   Shallow excavation 		   Landscaping 	
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433515:	1	   	T I	 	l I	   	I I
Cathro	- j 30	Very limited	i	Very limited	i İ	Very limited	i
	İ	Ponding	11.00	Ponding	11.00	Ponding	11.00
	1	Depth to	1.00	Depth to	1.00	Organic matter	11.00
	1	saturated zone	1	saturated zone	I	content	1
	1	Subsidence	1.00	Unstable	0.01	Depth to	1.00
	I	Frost action	1.00	•	•	saturated zone	1
	1		1	Dusty	0.01	Dusty	[0.01
Tawas	-   25	  Very limited	i	  Very limited	İ	  Very limited	i
	1	Ponding	11.00	Ponding	1.00	Ponding	1.00
	1	Depth to	1.00	Depth to	1.00	Organic matter	1.00
	1	saturated zone		saturated zone		content	1
	!	Subsidence	1.00			Depth to	11.00
	!	Frost action	11.00	•	•	saturated zone	10 01
	1		<u> </u>	Dusty 	10.01 I	Dusty 	0.01 
433572:	i	I	İ	İ	İ	I	i
Portwing	-  50	·				Very limited	1
	!	Depth to	:	•	11.00	· •	1.00
	!	saturated zone   Shrink-swell	  1.00	saturated zone   Too clayey	I  0.28	saturated zone	1
	-	Low strength	11.00		10.28	•	1
	i	Frost action	10.50		•	! 	i
	1	I	I	I	I	I	1
Herbster	-  30	·		• •		Very limited	
	!	Depth to		•		Depth to	1.00
	-	saturated zone   Shrink-swell	  1.00	saturated zone   Too clayey	I  0.28	saturated zone	1
	i .	Low strength	11.00		0.20	•	i
	i	Frost action	0.50	•	•	İ	i
422572	!		!	<u> </u>	!	<u> </u>	!
433573: Cornucopia	I -I 80	l  Verv limited	1	  Somewhat limited	 	  Somewhat limited	1
302a30p2a	i	Shrink-swell	11.00	•	0.50	•	0.37
	i	Low strength	11.00	·	0.37	•	i
	1	Frost action	10.50	Unstable	0.01	l	1
	!	Slope	10.37	excavation walls	!		!
433582:	1	 	1	 	l I	 	1
Croswell	- i 82	Somewhat limited	i	Very limited	i	Somewhat limited	i
	1	Depth to	0.19	Depth to	11.00	Droughty	0.64
	1	saturated zone	1	saturated zone	•	Too sandy	10.50
	!		1			Depth to	0.19
	-	1		excavation walls	 	saturated zone	!
433599:	i		i		i	· 	i
Annalake	-  85	Somewhat limited	I	Very limited	I	Not limited	1
	I	Frost action	10.50	•	1.00	I	1
	!		!	saturated zone	•	<u> </u>	!
	-	 	1	Unstable   excavation walls	0.01 	 	1
	i		i		i	i I	i
433600:	1		1	!	I	<u>.</u>	1
Annalake	-  80	•		Very limited	•	Somewhat limited	
	1	Frost action	10.50	· -	1.00	Slope	10.37
	1	Slope	10.37		  0.37	] 	1
	1	1 	i	-	0.37		1
		'	•	•		!	•
	1		1	<pre>  excavation walls</pre>	l		1

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

1 2	  Pct.	•	d	   Shallow excavation	ons	   Landscaping	
and soil name	of	· — — — — — — — — — — — — — — — — — — —		<u> </u>		<u> </u>	
	-	-		Rating class and		•	
	lunit	limiting features	<del>!</del>	limiting features	<u> </u>	limiting features	<del>!</del>
433671:	!	 	!	] 	 	 	!
Arnheim		•	i	  Very limited	! !	  Very limited	i
Almein	1 03	· -		_		Ponding	11.00
	i	-		•	•	Flooding	11.00
	i	•		saturated zone		-	11.00
	1	Frost action	1.00	Flooding	0.80	saturated zone	1
	I	Flooding	11.00	Unstable	0.01	Dusty	0.01
	I	I	1	excavation walls	•	I	I
	1	!	!	Dusty	0.01	!	!
422676	!	!	!	1	!	 	!
433676: Redrim	1 05	  Vor: limited	<u> </u>	  Very limited	I 	  Very limited	!
Kediliii	1 02	· -		Depth to hard		·	1 1 00
	i	bedrock		· -		Large stones	10.99
	i	•	•	•	0.35	•	i
	i	i	i	excavation walls	İ	Droughty	0.67
	I	I	I	I	l	I	I
433679:	I	I	I	I	l	I	I
Lapoin	85	•		• •		Somewhat limited	
	!	•	•	•		Depth to	10.75
	1	Low strength   Depth to	10.75		  1 00	saturated zone   Depth to bedrock	•
	;	saturated zone		•	•	Depth to bedrock	10.01
	i	•	0.50	•	0.28	i İ	i
	i		0.01		0.04	•	i
	I	bedrock	I	excavation walls	I	I	I
	I	I	I	I	l	I	I
433686:	1	<u> </u>	!	l	!		!
Zeba	90	•		• •		Very limited	11 00
	1	Depth to   saturated zone		· -		Depth to   saturated zone	1.00
	i .	•	•	•	•	Depth to bedrock	10.21
	i	•	10.20	· -		Large stones	10.03
	İ	bedrock	İ	Unstable	0.01	content	İ
	I	I	1	excavation walls	l	l	I
	1	!	!	!	l	<u> </u>	!
433729: Sultz	   0E	  Not limited	!	  Somewhat limited	  -	  Somewhat limited	!
Suitz	1 65	NOT IIMITEE	!	•	•	Droughty	10.01
	i	i i	i	excavation walls		l Droughey	1
	i	i	i	I	i	i i	i
433739:	I	l	I	I	I	I	1
Moquah	85	Very limited		Very limited		Very limited	1
	1	-		_		Flooding	11.00
	!	Frost action	10.50	•		•	[0.01
	!	1	!	-	0.80  0.01		!
	;	! !	<u> </u>	excavation walls		! !	
	i	i i	i		0.01	' 	i
	i		i		, <del></del>	I	i
433771:	1	I	I	I	I	I	I
Beaches	97	Not rated	1	Not rated	l	Not rated	1
422000	!	<u> </u>	1	<u> </u>	l	<u> </u>	1
433802:	1	 	I	  -	l I	  -	1
Udorthents, ravines and escarpments		Not rated	1	  Not rated	 	  Not rated	1
and escarpments	, 65 	NOC TACEG	1	Inot raced	ı I	Inot raced	Í
452739:	i		i		İ	i I	i
Water	100	Not rated	I	Not rated	l	Not rated	1
	I	l	I	l	I	l	I

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.	•	d	,   Shallow excavation	ons	   Landscaping 	
	map			Rating class and limiting features		Rating class and limiting features	
452765:	 	 	 	 	 	 	 
Abbaye	55	Somewhat limited	1	Very limited	I	Somewhat limited	1
	1	Depth to	10.75	Depth to hard	1.00	Depth to	10.75
	1	saturated zone	I	bedrock	I	saturated zone	1
	1	Depth to hard	0.61	Depth to	1.00	Depth to bedrock	0.42
	1	bedrock	1	saturated zone	l	I	1
	1	Frost action	10.50	Unstable   excavation walls	0.01 	 	1
	į		į	İ	İ		į
Lapoin	40	·		Very limited	•	Somewhat limited	
	!	Shrink-swell	1.00	•	11.00	· •	10.75
	!	Low strength	11.00			saturated zone	1
	!	Depth to	10.75	•	11.00	Depth to bedrock	10.01
	!	saturated zone				<u> </u>	!
	!	Frost action	10.50		0.28	•	!
	1	Depth to hard   bedrock	0.01 	Unstable   excavation walls	0.04 	 	1
4000555	į		į		İ	į	į
1383557:	1 05	  Town limited	!	  Trans. limited	  -	  Tom: limited	!
Au Gres	1 85	_		Very limited   Depth to		Very limited	11.00
	!	Depth to	1.00	•	1.00	· •	11.00
	!	saturated zone	!			saturated zone	10.00
		 	i	Unstable   excavation walls	1.00 	Droughty 	0.09 
1383580:	1	 	1	 	 	 	1
	1 40	  Very limited	i	  Very limited	I	  Very limited	i
	i	Ponding	11.00	_	1.00	_	11.00
	i	Depth to	11.00	•	11.00		11.00
	i	saturated zone	1	saturated zone	1	content	1
	i	Subsidence	11.00		1.00	•	11.00
	i	•	11.00	•	1	saturated zone	1
	i	Low strength	11.00		0.01	•	0.01
	i		I	excavation walls	•		i
	1	] 	1	Dusty 	0.01 	 	1
Beseman	30	  Very limited	i	  Very limited	İ	  Very limited	i
	1	Ponding	1.00	-	1.00	•	1.00
	1	Depth to	1.00	Depth to	1.00	Organic matter	1.00
	I	saturated zone	1	saturated zone	l	content	1
	I	Frost action	1.00	•	0.01	· •	1.00
	I	Low strength	1.00		l	saturated zone	1
		Subsidence 	1.00 	 	 	 	 
Dawson	28	Very limited	i	  Very limited	•	Very limited	i
	1	Ponding	1.00	Ponding	1.00	Ponding	1.00
	1	Depth to	1.00	Depth to	1.00	Depth to	1.00
	1	saturated zone	1	saturated zone	I	saturated zone	1
	1	Subsidence	1.00	Unstable	0.01	Dusty	0.01
	1	Frost action	1.00	excavation walls	I	l	1
	1	Low strength	11.00	Dusty	0.01	I	1
1383581:		 	!		  -	 	!
Rifle	1 00	  Very limited	1	  Vor: limited	! !	  Very limited	1
VTTT6	, 30 I	Ponding	1	Very limited   Ponding	  1.00	· -	11.00
		Depth to	11.00	_		Depth to	11.00
		Depth to   saturated zone	1	:	11.00 I	<del>-</del>	1
	:		11 00	•	•	•	10.01
	1	Frost action	11.00	•	11.00 I	Dusty 	10.01
	1	ı	1		•	!	!
	1		1				
		<b> </b> 	1	-	0.01  0.01		!
	 	 	 	-	0.01		

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.   of		d 	Shallow excavation	ons	Landscaping 	
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1383603: Cornucopia	  -  80     	  Very limited   Slope   Shrink-swell   Low strength   Frost action	    1.00  1.00  1.00	Slope   Too clayey   Unstable	1.00  0.50  0.01	İ	    1.00   
1383658:		 	 	 	 	 	 
Deerton	50         	Somewhat limited   Depth to hard   bedrock   	  0.01   	bedrock	1.00      0.98	Somewhat limited   Droughty   Depth to bedrock   	  0.78  0.01 
Brownstone	  -  40       	   Somewhat limited   Large stones   Depth to hard   bedrock 	  0.39  0.35   	bedrock   Unstable   excavation walls	1.00    1.00	content   Droughty   Depth to bedrock	  0.99    0.43  0.21
1383660:		 		 	 	 	
Deerton	-   50         	Somewhat limited   Slope   Depth to hard   bedrock 	  0.37  0.01   	bedrock   Unstable   excavation walls	1.00    0.98	Slope   Depth to bedrock	  0.78  0.37  0.01
Brownstone	  -  40         	   Somewhat limited   Large stones   Slope   Depth to hard   bedrock	  0.39  0.37  0.35 	Depth to hard   bedrock   Unstable   excavation walls   Large stones	1.00    1.00	Slope   Depth to bedrock	  0.99    0.43  0.37  0.21
1383662:	1	 	 	 	 	 	1
Abbaye	90             	Somewhat limited   Depth to   saturated zone   Frost action   Depth to hard   bedrock   Slope	  0.75    0.50  0.46    0.37	bedrock   Depth to   saturated zone   Slope	1.00    1.00    0.37  0.01	saturated zone   Slope   Depth to bedrock	10.37
1383665: Allendale	  -  35         	  Very limited   Depth to   saturated zone   Frost action   Shrink-swell	  1.00    0.50  0.15	saturated zone   Too clayey	1.00    0.50  0.01	saturated zone   Droughty	  1.00    0.13
Wakeley	 -  30           	  Very limited   Ponding   Depth to   saturated zone   Shrink-swell   Frost action	  1.00  1.00     0.57  0.50	Depth to   saturated zone   Too clayey	1.00  1.00      0.50  0.01	Depth to   saturated zone 	  1.00  1.00     

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

	Pct.   of	Local roads an   streets	ıd	Shallow excavation	ons	Landscaping 	
	-	•		Rating class and		•	
	lunit	limiting features	<u> </u>	limiting features	<u>!</u>	limiting features	<del>!</del>
1383665:		 	1	 	 	 	1
Kinross	20	  Very limited	i	  Very limited	i	  Very limited	i
	I	Ponding	11.00	Ponding	1.00	Ponding	11.00
	I	•				Depth to	11.00
	!	saturated zone	•	saturated zone	•	•	!
		Frost action	0.50 	Unstable   excavation walls	1.00 	 	1
1383960:	į	  -	į	 	 	  -	į
Flink	ı I 75	  Verv limited	i	  Very limited	! !	  Very limited	i .
	i	•		· -		Depth to	11.00
	I	saturated zone	1	saturated zone	I	saturated zone	1
	!	Frost action	10.50	•	0.01	<u> </u>	!
		! 	1	excavation walls	 	! 	
1444357:	l	<u> </u>	!	<u> </u>	!	<u> </u>	!
Arnheim	85	· -		• •		Very limited   Ponding	11.00
	1	•	•	•		Flooding	11.00
	i	saturated zone		saturated zone		•	11.00
	i	•				saturated zone	•
	I	Flooding	11.00	Unstable	0.01	Dusty	10.01
	!	!	!	excavation walls	•	!	!
		 	1	Dusty 	0.01 	 	1
1444359:	i	İ	i	İ	i	İ	i
Beaches	97	Not rated		Not rated	1	Not rated	1
1444367:	i	! 	i	! 	i	! 	i
Udorthents, ravines	İ	Ì	Ì	Ì	İ	Ì	İ
and escarpments	85	Not rated	!	Not rated	!	Not rated	!
1444378:	 	 	1	 	! !	 	1
Wakefield	85	Very limited	i	Very limited	i	Very limited	i
	I	Depth to	11.00	Depth to	1.00	Depth to	1.00
	1	saturated zone	•	saturated zone	•		1
	!	Frost action		-		Depth to	10.99
		 	1	Unstable   excavation walls		cemented pan   Large stones	  0.01
	i	İ	i	excavación waris		content	1
1444379:	1	 	1	 	 	 	1
Wakefield	I 85	  Verv limited	i	  Very limited	i i	  Very limited	i
	i	Depth to	11.00	•	•	Depth to	11.00
	I	saturated zone	1	saturated zone	I	saturated zone	1
	I	Slope	10.63	-	0.63	•	10.99
	!	Frost action	10.50	_	10.50	_	
		 	!	Unstable   excavation walls	0.01	Slope   Large stones	0.63  0.01
		! 		excavation waits	! 	content	10.01
1444388:		<u> </u>		  -		  -	1
1444388: Allendale	I 80	  Verv limited		  Very limited	! 	  Very limited	1
		Depth to	1.00		1.00		11.00
	I	saturated zone		:	İ	saturated zone	1
	I	Frost action	10.50	·	0.50	• • •	10.13
	1	Shrink-swell	0.15	Unstable	0.01	I	1
				<pre>  excavation walls</pre>			

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.   of	streets		Shallow excavation		Landscaping	
	_	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444402:	 	 	1	 	 	 	 
Tonkey	90	Very limited	i	Very limited	İ	Very limited	i
-	İ	Ponding	11.00	Ponding	11.00	Ponding	11.00
	I	Depth to	11.00	Depth to	1.00	Depth to	11.00
	1	saturated zone	1	saturated zone	I	saturated zone	1
	1	Frost action	1.00	Unstable	0.01	Dusty	0.01
	 	 	 	excavation walls   Dusty	  0.01	 	 
1444410:	 	 	1	] 	 	 	I I
Tula	. 80	Very limited	i	  Very limited	i	  Very limited	i
	İ	Depth to		_		Depth to	11.00
	I	saturated zone	1	saturated zone	I	saturated zone	1
	1	Frost action	1.00	Dense layer	0.50	Depth to	0.97
	1	I	1	Unstable	0.01	cemented pan	1
	I	I	1	excavation walls	•	Large stones	0.01
	1	I	1	Dusty	0.01		1
	1	 	 	 	 	Dusty 	0.01 
1444414:			!		ļ	177	!
Lupton	1 40	•		•	•	Very limited	11 00
	!	Ponding	11.00		•	Ponding	1.00
	1	Depth to   saturated zone	1.00		1.00	Organic matter   content	1.00 
	i .	Subsidence	11.00		•	Depth to	11.00
	i	Frost action	11.00		1	saturated zone	•
	i	i	i	•	0.01	Dusty	0.01
	i	İ	i	excavation walls		i	i
	1	  -	1	Dusty	0.01	  -	1
Cathro	·  30	  Very limited	i	  Very limited	! 	  Very limited	i
	1	Ponding	11.00	Ponding	11.00	Ponding	11.00
	1	Depth to	1.00	Depth to	1.00	Organic matter	1.00
	I	saturated zone		•	I	content	1
	!	Subsidence	•			Depth to	11.00
	!	Frost action	11.00	•		saturated zone	•
		 		Dusty 	U.UI	Dusty 	0.01 
Tawas	25	Very limited		•		Very limited	
	!	Ponding		•	11.00	•	1.00
	!	Depth to   saturated zone	1.00	Depth to   saturated zone	1.00	Organic matter   content	1.00 
	i .	Subsidence	•			Depth to	11.00
	i	Frost action	11.00		•	saturated zone	1
	į	!			0.01		0.01
1444425:		 	1	 	! 	 	
Lerch	·  50	Very limited	1	Very limited	I	Very limited	1
	I	Ponding	1.00	•	1.00	•	1.00
	1	Depth to	11.00		11.00	·	11.00
	!	saturated zone		•		Depth to	11.00
	1	Shrink-swell	11.00		11.00		I
		Frost action   Low strength	1.00  1.00		0.46 	! 	
Worksto-	1 25	  Vommulimited	1	  Norm limited	l	  Vorm limited	1
Herbster	1 35	Very limited		Very limited		Very limited	I I1 00
	1	Depth to   saturated zone	11.00	:	1.00	Depth to   saturated zone	1.00
	1	Saturated zone   Shrink-swell	11.00		  0.28		1
	i	Low strength	11.00	·	0.20		i
	i	Frost action	10.50			I	i
	:					1	

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

	Pct. Of	•	d	Shallow excavati 	ons	Landscaping 	
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
	Π	I	ī	I	ı	<u> </u>	ī
1444426: Portwing	   50   	  Very limited   Depth to   saturated zone	11.00	•	    1.00 	  Very limited   Depth to   saturated zone	    1.00
	 		1.00  1.00  0.50	Unstable	0.28  0.01 	•	 
Herbster	30             	Depth to Saturated zone Shrink-swell Low strength	11.00	saturated zone Too clayey Unstable	1.00    0.28  0.01	saturated zone	  1.00       
1444427: Cornucopia	   80       	Shrink-swell	   1.00  1.00  0.50  0.37	Slope   Unstable	0.50  0.37  0.01	i ·	    0.37   
1444428: Cornucopia	   80       	Slope	    1.00  1.00  1.00	Too clayey   Unstable	1.00  0.50  0.01	i -	    1.00   
1444431: Croswell	   82         	  Somewhat limited   Depth to   saturated zone   	    0.19   	saturated zone	1.00    1.00	Too sandy	    0.64  0.50  0.19
1444432: Gogebic	   85         	  Very limited   Depth to   saturated zone   Frost action 	1.00    0.50	saturated zone   Dense layer	1.00    0.50  0.01	saturated zone   Depth to	  1.00    0.71
1444435: Iosco	:	Depth to   saturated zone	11.00	saturated zone	1.00    0.01	saturated zone	    1.00   
1444457: Redrim	85         	Depth to hard bedrock	1.00 	Depth to hard   bedrock	1.00    0.35	  Very limited   Depth to bedrock   Large stones   content   Droughty	    1.00  0.99    0.67

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.   of		d	   Shallow excavation	ons	   Landscaping 	
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	1
1444459:	!		1		  -	 	1
Zeba	-I 90	  Very limited	i	  Very limited	! !	  Very limited	i .
	1	Depth to	11.00	•	1.00	_	11.00
	i		•	bedrock	İ	saturated zone	i
	İ	Frost action	11.00	Depth to	11.00	Depth to bedrock	0.21
	1	Depth to hard	10.20	saturated zone	I	Large stones	10.03
	1	bedrock	1	•	0.01	content	1
	!	1	!	excavation walls	!		!
1444460:	1	] ]	1	 	 	 	1
Abbaye	-i 55	  Somewhat limited	i	  Very limited		  Somewhat limited	i
	i	Depth to	0.75	•	1.00	•	0.75
	İ	saturated zone	İ	bedrock	İ	saturated zone	İ
	1	Depth to hard	0.61	Depth to	1.00	Depth to bedrock	0.42
	1	bedrock	1	saturated zone		<u> </u>	1
	!	Frost action	10.50	•	0.01	<u> </u>	!
	1	1	1	excavation walls	 	 	1
Lapoin	-I 40	  Verv limited	i	  Very limited	! !	  Somewhat limited	<u> </u>
	1	Shrink-swell	11.00	•	11.00	•	10.75
	i	•	11.00	•	İ	saturated zone	i
	1	Depth to	0.75	Depth to	11.00	Depth to bedrock	0.01
	1	saturated zone	I	saturated zone	I	I	1
	!		10.50	·	10.28	•	1
	1	Depth to hard   bedrock	0.01	Unstable   excavation walls	0.04	 	1
	1	Dedrock	i	excavation waits	! !	! 	<u> </u>
1444461:	i	i	i	i	i	i I	i
Abbaye	-  55	Somewhat limited	İ	Very limited	İ	Somewhat limited	Ì
	1	Depth to	0.75	Depth to hard	1.00	Depth to	10.75
	1	saturated zone		bedrock		saturated zone	1
	!	Depth to hard	0.61	•	11.00	Depth to bedrock	0.42
	!	bedrock   Frost action	I 10.50	saturated zone   Unstable	I I0.01	] 	!
	1	FIOSE ACCION	10.50	excavation walls		! 	<u> </u>
	i	i I	i	l cheavaeren warre	i I	! 	i
Zeba	- i 40	Very limited	i	Very limited	İ	Very limited	i
	1	Depth to	1.00	Depth to hard	1.00	Depth to	1.00
	I	saturated zone	1	bedrock	1	saturated zone	1
	!			-	11.00	·	
	-	Depth to hard   bedrock	10.20	•	  0.01	Large stones   content	10.03
	1	Dedrock	i	excavation walls		l content	<u> </u>
	i	i I	i	l cheavaeren warre	i I	! 	i
1444477:	i	İ	i	İ	İ	İ	i
Cublake	-  35		•	Very limited		Somewhat limited	1
	1	Depth to	0.19	•	11.00	·	10.53
	!	saturated zone	1	saturated zone	   0 1	Too sandy	10.50
	1	 	1	Unstable   excavation walls	0.15 	Depth to   saturated zone	10.19
	i	i i	i	excavacion walls	İ	346414664 20116	i
Croswell	-  20	Somewhat limited	i	  Very limited	İ	  Somewhat limited	i
	1	Depth to	0.19	Depth to	11.00	Droughty	10.56
	1	saturated zone	1	saturated zone	I	Too sandy	10.50
	1	, 545424554 25115	•		•		
	į		į		11.00		10.19

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.  Of	•	d 	   Shallow excavation 	ons	   Landscaping 	
		Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444477: Ashwabay	 		   	  -  Very limited   Depth to   saturated zone   Too clayey	      1.00    0.50  0.01	    Somewhat limited   Droughty   	      0.34   
1444478: Cublake	   35         	Slope	0.37  0.19 	Depth to   saturated zone   Slope	1.00    0.37  0.15	Slope	    0.53  0.50  0.37  0.19
Croswell		Depth to saturated zone	0.19 	Depth to saturated zone Unstable excavation walls	1.00    1.00 	  Somewhat limited   Droughty   Too sandy   Depth to   saturated zone   Slope	  0.56  0.50  0.19 
Ashwabay	   20         	Slope	0.37  0.19	Depth to   saturated zone   Too clayey   Slope	1.00    0.50  0.37  0.01	  Somewhat limited   Slope   Droughty   Depth to   saturated zone	  0.37  0.34  0.19 
1444479: Morganlake				Depth to saturated zone	1.00    0.01	•	    0.75     
1444480: Morganlake	   85       	•	0.75	Depth to   saturated zone   Slope	1.00    0.37  0.01	Slope	  0.75    0.37
1444481: Kellogg	   35         	  -  Somewhat limited   Depth to   saturated zone   Shrink-swell 	0.75    0.57	saturated zone Too clayey	1.00    0.32  0.02	İ	      0.75     
Allendale	   25         	·       =	11.00	saturated zone Too clayey	1.00    0.50  0.01	  Very limited   Depth to   saturated zone   Droughty 	  1.00    0.13 

Table 9.—Roads and Streets, Shallow Excavations, and Landscaping—Continued

Map unit symbol and soil name	Pct.  of		d	   Shallow excavation 	ons	   Landscaping 	
		Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444481: Ashwabay	   20       	    Not limited         	 	saturated zone   Too clayey	1.00    0.50  0.01	i I	    0.34   
1444482: Kellogg	   40       	Depth to   saturated zone   Shrink-swell	0.75	saturated zone   Slope   Too clayey	1.00    0.37  0.32  0.02	saturated zone   Slope 	    0.75    0.37 
Allendale	   25         	Depth to Saturated zone Frost action Shrink-swell	11.00	saturated zone Too clayey Slope	1.00    0.50  0.04  0.01	saturated zone Droughty Slope	  1.00    0.13  0.04
Ashwabay	   20         		  0.37         	saturated zone Too clayey Slope	1.00    0.50  0.37	Droughty   	  0.37  0.34   
1444486: Sedgwick	   50         	Depth to Saturated zone Shrink-swell Frost action	   1.00   1.00   1.00   1.00	saturated zone Too clayey Unstable excavation walls	1.00    0.50  0.29	saturated zone Dusty I	  1.00    0.01 
Munuscong	   30           	Ponding   Depth to   saturated zone   Frost action	  1.00  1.00    1.00  0.04	Depth to   saturated zone   Too clayey   Unstable   excavation walls	1.00  1.00        0.97	Depth to   saturated zone   Dusty   	  1.00  1.00    0.01
1444487: Superior	   50           	saturated zone Shrink-swell Low strength	      1.00    1.00  1.00  0.50	saturated zone   Too clayey   Unstable   excavation walls   Dusty	1.00    1.00  0.33	saturated zone Dusty I	    1.00    0.01   

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

	Pct.   of		d 	Shallow excavation 	ons	Landscaping 	
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444487:	 	 	 	 	 	 	 
Sedgwick	I 30	Verv limited	i	  Very limited	I	  Very limited	i
	, I	·       =	1.00			Depth to	11.00
	i	:	•	•		saturated zone	i
	İ	Shrink-swell	11.00	Too clayey	0.50	Dusty	0.01
	I	Frost action	1.00	Unstable	0.29	Ī	1
	I	Low strength	1.00	excavation walls	l	I	1
	!	<u> </u>	!	Dusty	0.01	<u> </u>	!
1444488:	 	! 	<u> </u>	! 	l I	! 	
Superior	50	Very limited	i	Very limited	İ	Very limited	i
-	İ	Depth to		_	1.00	Depth to	11.00
	I	saturated zone	I	saturated zone	I	saturated zone	1
	I	Shrink-swell	11.00	Too clayey	11.00	Slope	10.37
	I		1.00	Slope	0.37	Dusty	10.01
	I		10.50		0.33	I	I
	I	Slope	10.37			<u> </u>	1
	 	 	!	Dusty	0.01	 	1
Sedgwick	30	  Very limited	i	  Very limited	İ	  Very limited	i
	I	Depth to	1.00	Depth to	1.00	Depth to	11.00
	I	saturated zone	I	•	l	saturated zone	1
	I	•	1.00		0.50	•	0.01
	I		11.00		0.29	<u> </u>	1
	!	Low strength	11.00	•		<u> </u>	!
	 	 		Dusty 	0.01 	 	!
1444489:	i	i İ	i	i I		i İ	i
Sultz	35	Very limited	I	• •		Very limited	1
	I	Slope	1.00	-	11.00	•	11.00
	 	 	1	Unstable   excavation walls		Droughty	10.01
	! 	! 	i	excavacion waiis	i I	! 	i
Ashwabay	25	Very limited	I	Very limited	I	Very limited	1
	I	Slope	1.00	Slope	1.00	Slope	1.00
	I	I	I	•	1.00	Droughty	10.34
	!	<u> </u>	!	•	l	<u> </u>	!
	!	 	!		0.50  0.01	•	!
	! 	! 	<u> </u>	excavation walls	•	! 	i .
	İ	ĺ	İ	ĺ	ĺ	l	Ì
Rubicon	20	-	•		•	Very limited	
	1	Slope	11.00	·	11.00	Slope	11.00
	! 	! 	<u> </u>	excavation walls		Droughty   Too sandy	10.93
	ĺ	l	İ	ĺ	ĺ	Ī	İ
1444492: Manistee	I I 4∩	  Very limited	1	  Very limited	 	  Very limited	1
Maniscee	1 <del>4</del> 0	Slope	11.00	•	  1.00	_	11.00
	i	Shrink-swell	10.04	•	0.28	•	10.50
	i	l Surrum Swerr	1		0.01	·	0.13
	i	İ	i	excavation walls	•		i
		  Vor: limited		  Von: limited	 	  Vor: limited	1
Vollogg		Very limited		Very limited   Slope	  1.00	Very limited   Slope	1 1.00
Kellogg	30 	=	11 00			I DIONE	1 00
Kellogg	30   	Slope	10.75	=		•	10.75
Kellogg	30   	Slope   Depth to	1.00  0.75 	Depth to	11.00	Depth to	0.75 
Kellogg	30       	Slope	0.75 	Depth to   saturated zone	1.00 	Depth to saturated zone	0.75   
Kellogg	30         	Slope   Depth to   saturated zone	•	Depth to   saturated zone   Too clayey	11.00	Depth to saturated zone	0.75     

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.   of	•	d	   Shallow excavation	ons	   Landscaping 	
		Rating class and limiting features	•	Rating class and   limiting features		Rating class and   limiting features	
1444492: Ashwabay	   20         	•	      1.00         	Slope   Depth to   saturated zone   Too clayey	1.00  1.00      0.50  0.01	Droughty   	    1.00  0.34   
1444506: Keweenaw	 	    Not limited     	         	    Somewhat limited   Unstable   excavation walls	0.27	  Somewhat limited   Droughty   Large stones   content	    0.06  0.01
Rubicon	   30   	  Not limited     	     	  Very limited   Unstable   excavation walls	11.00	  Somewhat limited   Droughty   Too sandy 	    0.67  0.50
1444507: Keweenaw	   60     	•	•	excavation walls	0.27 	  Somewhat limited   Slope   Droughty   Large stones   content	    0.16  0.06  0.01
Rubicon	   30     	•	    0.37   	Unstable   excavation walls	11.00	Too sandy	  0.67  0.50  0.37
1444585: Meehan, beaches	     90     	Depth to   saturated zone   Low strength	1.00 	Depth to   saturated zone   Unstable	1.00    1.00	•	    1.00    0.50  0.29
1444586: Wurtsmith, beaches	   90       	Low strength	1.00  0.19	saturated zone	1.00    1.00	  Somewhat limited   Droughty   Depth to   saturated zone 	    0.26  0.19 
1444587: Grayling, beaches	   95     	=	    1.00 	  Very limited   Unstable   excavation walls 	11.00	  Somewhat limited   Droughty   Too sandy 	    0.88  0.50
1529830: Meehan, beaches	   90     	Depth to   saturated zone	    1.00    1.00	saturated zone	    1.00    1.00	saturated zone	    1.00    0.50
	 		0.50 	•	•	Droughty 	0.29 

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.	streets		,   Shallow excavation 		   Landscaping 	
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1700372:	1	 	1	 	 	 	1
Loxley	-i 40	Verv limited	i	Very limited	i	Very limited	i
	i	Ponding	11.00	· -	1.00	•	11.00
	i	Depth to	11.00	Depth to	11.00	Organic matter	11.00
	1	saturated zone	1	saturated zone	I	content	1
	1	Subsidence	1.00	Organic matter	1.00	Depth to	1.00
	1	Frost action	1.00	content	I	saturated zone	1
	I	Low strength	1.00		0.01	Dusty	0.01
	!		!	excavation walls	•	!	!
	!	 	1	Dusty	0.01	1	
Beseman	-1 3U	l Worr limited	1	  Very limited	! !	  Very limited	1
besellari	-1 20	Ponding	11.00	· -	1  1.00	•	11.00
	i	Depth to	11.00	•	11.00	•	11.00
	i	saturated zone	1	•	 	content	1
	i	Frost action	11.00	•	•	Depth to	11.00
	İ	Low strength	11.00	excavation walls	ĺ	saturated zone	Ì
	1	Subsidence	1.00	I	I	l	1
		!	1	1	I	1	
Dawson	-  28			Very limited	•	Very limited	
	!	Ponding	1.00	-	11.00	•	1.00
	-	Depth to   saturated zone	1.00	•	1.00 	Depth to   saturated zone	1.00
	-	Subsidence	1 1 00	•	1 10.01	•	  0.01
	i	Frost action	11.00			l Dascy	1
	i	Low strength	11.00	•	0.01	i İ	i
	1	I	I	I	I	I	1
1700373:	1	l	1	I	I	I	1
Rifle	-  90	·		• •		Very limited	
	!	Ponding	1.00	-	11.00	•	1.00
	!	Depth to	1.00	•	1.00	•	1.00
	-	saturated zone   Frost action	11.00	saturated zone   Organic matter	I  1.00	saturated zone   Dusty	  0.01
	i	l Frost action	1		1	l Dusty	10.01
	i		i	•	,  0.01	i	i
	i	İ	i	•	0.01	•	i
	Ì		İ	excavation walls	ĺ	İ	İ
1700374:	!		1		I		1
Allendale	  -  35	l  Very limited		  Very limited	 	  Very limited	1
MITERICATE	1 33	Depth to	11.00		11.00	• •	11.00
	i	saturated zone	•	:	 I	saturated zone	1
	İ	Frost action	0.50	Too clayey	0.50	Droughty	0.13
	1	Shrink-swell	0.15	Unstable	0.01	I	1
	!	<u> </u>	1	excavation walls	ļ .	!	1
Wakeley	-1 30 	  Very limited	1	  Vor: limited	  -	  Very limited	1
wakeley	-1 20	Ponding	11.00	Very limited   Ponding	  1.00	_	11.00
	i	Depth to	11.00	-	11.00	•	11.00
	i	saturated zone	1	•	1	saturated zone	1
	i	Shrink-swell	0.57		0.50		i
	İ	Frost action	0.50		0.01	Ì	Ì
	1	I	1	excavation walls	I	l	1
W:	1		1	 	l	 	I
Kinross	-  20	Very limited		Very limited		Very limited	  1.00
	-	Ponding   Depth to	1.00  1.00	•	1.00  1.00	•	11.00
	1	Depth to   saturated zone	1 ± . 00	bepth to   saturated zone	, 1.00 I	bepth to   saturated zone	1 ± . 00
	i	Frost action	0.50		1	•	i
	i		1	excavation walls	•	I	i
	•	•	1	:		1	-

 ${\tt Table 9.-Roads \ and \ Streets, \ Shallow \ Excavations, \ and \ Landscaping-Continued}$ 

Map unit symbol and soil name	Pct.	•	d	Shallow excavatio 	ons	Landscaping 	
	map  unit	Rating class and limiting features	•	Rating class and   limiting features		Rating class and   limiting features	
1702605: Menominee	  -   85     	_	      1.00   	·	1.00  0.01	· •	      1.00 
1702606: Deerton	  -   50     	  Somewhat limited   Depth to hard   bedrock   	      0.01   	bedrock	1.00    0.98	Depth to bedrock	    0.78  0.01
Brownstone	  -  40         	Large stones	  0.39  0.35   	bedrock   Unstable   excavation walls	1.00    1.00	content Droughty Depth to bedrock	  0.99    0.43  0.21
1702607: Deerton	  -  50       	· •	    0.37  0.01   	bedrock   Unstable   excavation walls	1.00      0.98	Slope   Depth to bedrock	    0.78  0.37  0.01
Brownstone	  -  40         	Large stones Slope	  0.39  0.37  0.35 	bedrock   Unstable   excavation walls   Large stones	1.00    1.00	content Droughty Slope Depth to bedrock	  0.99    0.43  0.37  0.21
	  -  90               	saturated zone   Frost action   Depth to hard   berock	    0.75    0.50  0.46    0.37	bedrock   Depth to   saturated zone   Slope	1.00    1.00  1.00    0.37	saturated zone Slope Depth to bedrock	    0.75    0.37  0.29   
1711685: Cublake	  -  50       		    0.19     	saturated zone	1.00      0.15	Too sandy	  0.53  0.50  0.19
Keweenaw	  -  30     	  Not limited     	       	  Somewhat limited   Unstable   excavation walls 	0.27	  Somewhat limited   Droughty   Large stones   content	  0.06  0.01

## Table 10.—Sewage Disposal

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

	Pct. of	Septic tank   absorption fiel	.ds	Sewage lagoons 		
		Rating class and		Rating class and	IValue	
		limiting features		limiting features		
433292:		<u> </u>	1	  -	1	
Lerch	I I 50	  Very limited	<u> </u>	  Very limited	<u> </u>	
	1	Ponding	11.00	· -	11.00	
	i	Depth to	11.00		11.00	
	i	saturated zone	i	content	i	
	I	Slow water	11.00	Depth to	11.00	
	I	movement	1	saturated zone	1	
	I	Seepage, bottom	1.00	Seepage	1.00	
		layer	!		!	
Herbster	   35	  Very limited	;	  Very limited	i	
	I	Depth to	1.00	Depth to	11.00	
	I	saturated zone	1	saturated zone	1	
	I	Slow water	1.00	Seepage	10.53	
		movement	1	  -	1	
433296:	İ	! 	i	! 	i	
Cublake	35	Very limited	1	Very limited	1	
	I	Depth to	1.00	Seepage	1.00	
	I	saturated zone	1	Depth to	0.75	
	!	Slow water	10.72	•		
	 	movement		Slope 	10.08	
Croswell	20	  Very limited	i	'  Very limited	i	
	I	Depth to	1.00	Seepage	11.00	
	I	saturated zone	1	Depth to	1.00	
	I	Filtering	1.00	•	1	
	!	capacity		Slope	10.08	
	 	Seepage, bottom   layer	1.00 	 	<u> </u>	
	İ	<u> </u>	İ	İ	İ	
Ashwabay	20	Very limited		Very limited		
	!	Depth to	1.00		1.00	
	!	saturated zone   Slow water	1	Depth to   saturated zone	0.19 	
	<u> </u>	movement	1	Slope	10.08	
	i		i		1	
433299: Cublake	25	  Town limited	!	  Tom: limited	!	
Cubiake	1 33	Very limited   Depth to	1	Very limited   Seepage	11.00	
	<u> </u>	saturated zone	1	Slope	11.00	
	i	Slow water	•	Depth to	10.75	
	i	movement	1	saturated zone	1	
	i	Slope	0.37	i	i	
Croswell	l l 20	  Very limited	1	  Very limited	 	
	~	Depth to	11.00	_	11.00	
	i	saturated zone	1	Depth to	11.00	
	I	Filtering	11.00	_	i	
	I	capacity	İ	Slope	11.00	
		Seepage, bottom	11.00	I	1	
	ı		12.00	1	1	
	 	Seepage, Doctom   layer   Slope	10.04	l	į	

Table 10.—Sewage Disposal—Continued

	  Pct.   of	-	ds	Sewage lagoons		
	-	Rating class and limiting features		Rating class and   limiting features		
433299: Ashwabay		saturated zone Slow water movement	1.00    1.00 	Slope   Depth to   saturated zone	      1.00  1.00  0.75	
433300: Kellogg	       35   	    Very limited   Depth to   saturated zone   Slow water	0.37        1.00 	  -  Very limited   Seepage   Depth to   saturated zone	      1.00  0.99	
Allendale	•	saturated zone	      1.00    1.00	Depth to	0.32      1.00  1.00 	
Ashwabay	   20       	saturated zone	1.00 	    Very limited	  1.00  0.32  0.19	
433301: Kellogg	   40   41     1   1	saturated zone Slow water movement	    1.00    1.00    1.37	Slope   Depth to   saturated zone	    1.00  1.00  0.99	
Allendale	   25         	saturated zone Slow water movement	  1.00    1.00  1.00	Depth to   saturated zone   Slope	  1.00  1.00    1.00	
Ashwabay	   20           	Depth to Saturated zone Slow water movement	  1.00    1.00    0.37	Slope   Depth to   saturated zone	  1.00  1.00  0.19 	
433304: Sedgwick	   50       	saturated zone   Slow water	    1.00    1.00	saturated zone	  1.00    0.53  0.08	
Munuscong	   30           	Depth to saturated zone	1.00  1.00      1.00	Seepage   Depth to	  1.00  1.00  1.00 	

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct.   of	·	.ds	   Sewage lagoor 	ıs
	_	Rating class and	Value	_	
	lunit	limiting features	<del>!</del>	limiting features	<del>!</del>
433305:	1	! 	<u> </u>	! 	<u> </u>
Superior	- j 50	Very limited	i	Very limited	i
	1	Depth to	1.00	Depth to	1.00
	1	saturated zone		saturated zone	
	1	Slow water   movement	1.00		10.53
	1	movement		Slope	10.32
Sedgwick	· · I 30	  Very limited	i	  Very limited	i
	i	Depth to	11.00	•	11.00
	1	saturated zone	1	saturated zone	1
	1	Slow water	1.00	Seepage	10.53
	!	movement	!	Slope	10.08
433309:	1		!	 	!
	I - I 50	  Very limited	<u> </u>	  Very limited	1
Daperror	1	Depth to	11.00	_	11.00
	i	saturated zone	i	saturated zone	i
	1	Slow water	11.00	Slope	11.00
	1	movement	1	Seepage	10.53
	!	Slope	10.37	<u> </u>	!
Sedgwick	1 30 	  Very limited	1	  Very limited	!
sedgwick	1 30	Depth to	  1.00	•	11.00
	i	saturated zone	1	saturated zone	1
	i	Slow water	11.00	   Slope	11.00
	1	movement	1	Seepage	10.53
400040	1	<u> </u>	1	<u> </u>	!
433310: Sultz	. I 25	  Very limited	1	  Very limited	!
54162	1 33	Slope	  1.00	•	11.00
	i	Slow water	0.47	•	11.00
	İ	movement	İ	İ	Ì
	1	<u> </u>	1	<u> </u>	1
Ashwabay	-  25	Very limited		Very limited	11 00
	1	Depth to   saturated zone	1.00 	Slope   Seepage	1.00  1.00
	i	Slow water	11.00		10.19
	i	movement	i	saturated zone	i
	1	Slope	1.00	l	1
		<u> </u>	!	<u> </u>	!
Rubicon	-  20	Very limited		Very limited	11.00
	1	Filtering   capacity	1.00 	Slope   Seepage	11.00
	i	Slope	11.00		1
	i	Seepage, bottom	11.00	İ	i
	1	layer	1	l	1
422214.	1		!		!
433314: Manistee	I . I 40	  Very limited	1	  Very limited	1
Maiita Cee	, <del>1</del> 0	Very limited   Slow water	11.00	_	11.00
	i	movement	1	Seepage	11.00
	1	Slope	11.00		I
	1	<u> </u>	1	<u> </u>	1
Kellogg	-  30	Very limited		Very limited	
	1	Depth to	1.00	•	11.00
	1	saturated zone   Slow water	  1.00	Seepage   Depth to	1.00  0.99
	i	movement	1	saturated zone	10.99
	İ	Slope	11.00	•	i
	1	I	1	I	1

Table 10.—Sewage Disposal—Continued

	Pct.   of	Septic tank absorption fiel	.ds	Sewage lagoon 	ıs
	map	Rating class and	Value	Rating class and	Value
	unit	limiting features	1	limiting features	1
		l	1	1	1
433314:	1	<u> </u>	!	l	!
Ashwabay	20	Very limited		Very limited	1 00
	!	Depth to   saturated zone	1.00	Slope   Seepage	1.00  1.00
	<u> </u>	Slow water	  1.00		10.19
	i	movement	1	saturated zone	1
	İ	Slope	11.00	İ	i
400006	!	!	!	<u> </u>	1
433326: Rubicon	   85	  Very limited	1	  Very limited	!
Rubicon	1 03	Filtering	11.00	_	11.00
	i	capacity	1	Slope	10.08
	i	Seepage, bottom	11.00	· •	i
	ĺ	layer	İ	l	Ì
433379:			1	 	1
	   80	  Very limited	<u> </u>	  Very limited	
	i	Depth to	11.00	· -	11.00
	I	saturated zone	1	Depth to	11.00
	I	Slow water	1.00	saturated zone	1
		movement	!		1
433515:	 	! 		I 	
Lupton	40	Very limited	i	Very limited	i
	I	Ponding	1.00	Ponding	1.00
	I	Depth to	1.00		1.00
	1	saturated zone		content	
	!	Subsidence		Depth to	1.00
	 	Seepage, bottom   layer	1.00 	saturated zone   Seepage	  1.00
	İ	i -	i	l .	i
Cathro	30	Very limited		Very limited	
	!	Ponding	1.00		1.00
	!	Depth to   saturated zone	1.00 	Organic matter   content	11.00
	<u> </u>	Slow water	10.72	•	11.00
	i	movement	1	saturated zone	1
	ĺ	İ	Ì	Seepage	11.00
W			1		!
Tawas	25 	Very limited   Ponding	  1.00	Very limited   Ponding	11.00
	i	Depth to	11.00		11.00
	i	saturated zone		content	1
	i	Subsidence	11.00		11.00
	I	Seepage, bottom	11.00	Depth to	11.00
	!	layer	!	saturated zone	1
433572:	I I	1 		I 	1
	50	  Very limited	i	Very limited	i
	l	Depth to	1.00	· -	1.00
	1	saturated zone		saturated zone	
	I I	Slow water   movement	11.00	Seepage   Slope	10.53
	<u>'</u>	movement	i	   DIOPE	0.32
Herbster	30	Very limited		Very limited	1
	!	Depth to	11.00	· -	11.00
	1	saturated zone	11 00	saturated zone	10 52
	I I	Slow water   movement	11.00	Seepage 	10.53
	i		i	I	i

Table 10.—Sewage Disposal—Continued

	  Pct.   of	-	ds	Sewage lagoons		
	map	· —————		Rating class and	Value	
	-	limiting features		limiting features		
	!	!	1	!	1	
433573:	I 00	 	!	 	!	
Cornucopia	1 80	very limited   Slow water	11.00	Very limited	11 00	
	1	slow water   movement	11.00	Slope   Seepage	1.00  0.53	
	<u> </u>	Slope	10.37	Seepage 	10.55	
	i		1	i I	i	
433582:	I	I	1	I	I	
Croswell	82	Very limited		Very limited	1	
	I	Depth to	11.00	·	11.00	
	l	saturated zone		Depth to	11.00	
	l .	Filtering	11.00	•	1	
	!	capacity	11 00	Slope	10.08	
	! !	Seepage, bottom   layer	11.00	 		
	' 	rayer	i	! 	i	
433599:	i	İ	i	i İ	i	
Annalake	85	Very limited	1	Very limited	1	
	I	Depth to	1.00	Depth to	1.00	
	I	saturated zone	1	saturated zone	1	
	I	Slow water	10.47		10.53	
		movement	1	Slope	10.32	
433600:	! !	 		 		
Annalake	I 80	  Very limited	i	  Very limited	i	
	i	Depth to	11.00	=	11.00	
	I	saturated zone	1	saturated zone	1	
	I	Slow water	0.47	Slope	1.00	
	I	movement	1	Seepage	10.53	
	!	Slope	10.37	<u> </u>	!	
433671:	1	l I	1	l I	1	
Arnheim	'   85	  Very limited	i	  Very limited	i	
	i	Flooding	11.00	_	11.00	
	ĺ	Ponding	11.00	Flooding	11.00	
	I	Depth to	1.00	Depth to	1.00	
	I	saturated zone	1	saturated zone	1	
	I	Slow water	0.47	Seepage	10.53	
	 	movement	1	 	1	
433676:	! !	 		 	!	
Redrim	' I 85	  Very limited	i	  Very limited	i	
	i	Depth to bedrock		•	11.00	
	ĺ	Seepage, bottom	11.00	bedrock	İ	
	I	layer	1	Seepage	1.00	
	I	Slow water	0.72	Slope	10.08	
	I	movement	1	Large stones	10.02	
122670.	1	  -	I	  -	1	
433679: Lapoin	I I 85	  Very limited	I	  Very limited	1	
пароти	, 05 I	Depth to	11.00	_	11.00	
	i	saturated zone	1	bedrock	1	
	i	Slow water	1.00		11.00	
	İ	movement	i	saturated zone	1	
	I	Depth to bedrock	1.00		0.53	
	I	I	1	Slope	10.08	
	I	I	1	I	1	

Table 10.—Sewage Disposal—Continued

	Pct.  Of	   Septic tank   absorption fiel		   Sewage lagoon 	ıs
	map	Rating class and   limiting features	Value	Rating class and	
433686: Zeba	 	    Very limited   Depth to	      1.00	    Very limited   Depth to hard	      1.00
	       	saturated zone   Depth to bedrock   Slow water   movement 	1.00  0.72	Depth to   saturated zone   Seepage	  1.00    0.53  0.08
433729:	i	 	i	! 	i
Sultz	85     	•	  0.47 	Very limited   Seepage   Slope 	  1.00  0.08
433739: Moquah		Flooding   Depth to   saturated zone	1.00  1.00	  Very limited   Flooding   Depth to   saturated zone   Seepage	  1.00  1.00    0.53
433771: Beaches	     97	    Not rated		    Not rated	
433802: Udorthents, ravines and escarpments		  -    Not rated 	     	      Not rated	 
452739: Water	   100	  Not rated 	i I I	  Not rated 	i !
452765: Abbaye		Depth to   saturated zone   Depth to bedrock	1.00    1.00  0.72	Depth to   saturated zone   Seepage	   1.00   1.00   1.00   10.53   0.08
Lapoin			1.00    1.00	saturated zone	  1.00    1.00    0.53  0.08
1383557: Au Gres	   85             	  Very limited   Depth to   saturated zone   Filtering   capacity   Seepage, bottom   layer	1.00    1.00    1.00	Depth to   saturated zone 	      1.00  1.00   

Table 10.—Sewage Disposal—Continued

map   Rating class and   Value   Rating class and   Value   limiting features		  Pct.   of	Septic tank   absorption fiel	ds	   Sewage lagoor 	ıs
Unit    limiting features     limiting features			<del></del>		Pating class and	1772 1110
Loxley		-	-		-	
Loxley		ı	I	T	l	T
Ponding		1	<u> </u>	!		!
Depth to   1.00   Organic matter   1.00   Saturated zone	Loxley		•		· -	
saturated zone   content   Subsidence   1.00   Seepage   1.00   Seepage   1.00   Seepage   1.00   Seepage   1.00   Seepage   1.00   Depth to   1.00   Dept		!	•	•		•
Subsidence   1.00   Seepage   1.0		!	•	:		:
Seepage, bottom   1.00   Depth to   1.00   layer		!	•	•	•	•
layer		1		•		•
Beseman		! 		I	· •	
Ponding		i		i		i
Depth to	Beseman	30	Very limited	I	Very limited	1
Saturated zone   Content     Slow water   11.00   Depth to   11.00   movement   saturated zone     Subsidence   11.00   Seepage   11.00   Seepage   11.00   Depth to		I	Ponding	1.00	Ponding	1.00
Slow water   1.00   Depth to   1.00   movement   saturated zone   saturated zone   1.00   Seepage   1.00   Seepage   1.00   Seepage   1.00   Depth to   1.00   Ponding   1.00   Depth to   1.00   Depth   1.00   Depth to   1.00   Depth to   1.00   Depth   1.00   De		l	•	1.00		11.00
movement		l	•	•	•	•
Subsidence   1.00   Seepage   1.00   Dawson		I		:	· •	11.00
Dawson		I	•	•	•	
Ponding			Subsidence	1.00	Seepage	1.00
Ponding	Dawson	ı I 28	  Verv limited	<u> </u>	  Verv limited	i
Depth to   1.00   Organic matter   1.00   Saturated zone			——————————————————————————————————————		·	11.00
Subsidence   1.00   Seepage   1.00   Seepage   1.00   Seepage   1.00   Depth to   .00   Depth to   1.00   Depth to   1.00   Depth to   1.00   Depth to   1.00   Depth to   1.00   Depth to   1.00   Depth to   1.00   Depth to   1.00   Depth to   Depth   Dep		i	•	11.00	Organic matter	11.00
Seepage, bottom   1.00   Depth to   1.00   layer   saturated zone		ĺ	saturated zone	İ	content	İ
layer   saturated zone		I	Subsidence	1.00	Seepage	1.00
Slow water   0.47		I	Seepage, bottom	1.00	Depth to	1.00
movement		l	layer	1	saturated zone	1
1383581:		I		0.47	I	I
Rifle			movement	!		!
Rifle	1383581:	 	 	1	 	1
Ponding   1.00   Ponding   1.00   Depth to   1.00   Organic matter   1.00   Saturated zone		I 90	'  Verv limited	i	'  Verv limited	i
Depth to   1.00   Organic matter   1.00   Saturated zone     content			•		· -	11.00
Seepage, bottom   1.00   Seepage   11.00   layer   Depth to   1.00   layer   Depth to   1.00   layer   Depth to   1.00   layer   Depth to   1.00   layer   Depth to   Depth to   Depth to   Depth to   Depth to   Depth to bedrock   Depth to hard   Depth to bedrock   Depth to hard   Depth to hard   Depth to bedrock   Depth to hard   Dep		ĺ	Depth to	11.00	Organic matter	11.00
layer   Depth to   1.00   1.		I	saturated zone	I	content	1
		I	Seepage, bottom	1.00	Seepage	1.00
		l	layer	1	Depth to	11.00
Cornucopia		1	!	1	saturated zone	1
Cornucopia	1303603.			1	1	1
Slow water   1.00   Slope   11.00   Slope   10.50   1.00   1.		I 80	ı  Verv limited	<u> </u>	l  Verv limited	<u> </u>
movement   Seepage   0.5	001ma00p1a	1	•		· -	11.00
		i	•	I	· •	10.53
Deerton		İ	Slope	11.00		i
Deerton		l	l	I	l	I
Depth to bedrock   1.00   Depth to hard   1.00   Slow water   0.72   bedrock			<u> </u>	!	l	!
Slow water   0.72   bedrock	Deerton	50	•		_	
movement     Seepage   1.00		1	_		· •	
		!		10.72		•
		1	movement	!		
Brownstone   40   Very limited     Very limited		! 	! 	i	l probe	
	Brownstone	40	  Very limited	i	Very limited	:
		I	Seepage, bottom	1.00	Depth to hard	1.00
1 1 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		I	layer	I	bedrock	1
		I	Depth to bedrock	1.00		1.00
		I		10.72		10.87
		!	•	•	·	10.08
		l	Large stones			

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct.	Septic tank   absorption fiel	ds	Sewage lagoons		
and soll name	map	<del></del>		Rating class and	Value	
	-	limiting features		limiting features		
1383660:			1		1	
Deerton	I I 50	  Very limited	i	  Very limited	i	
	i	Depth to bedrock		•	11.00	
	I	Slow water	0.72	bedrock	1	
	I	movement	1	Seepage	1.00	
	1	Slope	10.37	Slope	1.00	
Brownstone	40	  Very limited	i	  Very limited	i	
	I	Seepage, bottom	1.00	Depth to hard	11.00	
	I	layer	•	bedrock	1	
	!	Depth to bedrock			1.00	
	1	Slow water   movement	10.72	Slope   Large stones	1.00  0.87	
	;	•	  0.39		10.67	
	i	Slope	10.37		i	
	İ	İ	İ	İ	İ	
1383662:	1	177	1	 	1	
Abbaye	1 90	Very limited   Depth to	  1.00	Very limited   Depth to hard	11.00	
	<u> </u>	saturated zone		bepth to hard   bedrock	1	
	i	Depth to bedrock	•	•	11.00	
	I	Slow water	0.72	saturated zone	1	
	I	movement	1	Slope	11.00	
	1	Slope	10.37	Seepage	10.53	
1383665:	i .	! 	i	! 	i	
Allendale	35	Very limited	i	Very limited	i	
	I	Depth to	1.00		11.00	
	!	saturated zone	•	Depth to	11.00	
		Slow water   movement	11.00	saturated zone   Slope	l 10.08	
	i		i		1	
Wakeley	30	Very limited	1	Very limited	1	
	1	Ponding	1.00	•	11.00	
	!	Depth to		Organic matter	1.00	
	1	saturated zone   Slow water	I I1 00	content   Seepage	  1.00	
	i	movement		Depth to	11.00	
	İ	İ	İ	saturated zone	İ	
	1	l	!		!	
Kinross	1 20	Very limited   Ponding		Very limited	1	
	1	Ponding   Depth to	1.00  1.00	•	11.00	
	i	saturated zone		content	1	
	İ	Filtering	11.00	Seepage	11.00	
	I	capacity	•	Depth to	1.00	
	1	Seepage, bottom	11.00	saturated zone	1	
	1	layer 	1	 	1	
1383960:	i	 	i	 	i	
Flink	75	Very limited	I	Very limited	I	
	1	Depth to	11.00		1.00	
	1	saturated zone		Depth to	11.00	
	1	Slow water   movement	10.72	saturated zone 	1	
	!			! 	i	

Table 10.—Sewage Disposal—Continued

map	absorption fiel Rating class and limiting features	Value	Rating class and   limiting features	
-	•		•	
			,	1
	<u> </u>	I	!	I
	<u> </u>		<u> </u>	
85	_		Very limited	
	•		Ponding	1.00
	•		•	1.00
	·		· -	1.00
	•			•
	Slow water	0.47	Seepage	0.53
	movement	1	<u> </u>	1
		!		!
07	  Not mated	!	  Not mated	!
91	NOT rated		NOT rated	!
 	! 	i	! 	<u> </u>
! 	' 	i	' 	i
	•	i	  Not rated	i
05	l	i	l	i
! 	' I	i	i İ	i
85	'  Verv limited	i	'  Verv limited	i
	•		· -	11.00
' 	·		·	1
! 	· •		·	1.00
! 	·		· -	
! 	•		•	0.53
! 	•	1		10.32
! 	I movement	i	l probe	10.52
' 	i İ	i	i İ	i
85	Verv limited	i	Verv limited	i
	· -		•	11.00
	·		·	1
' 	· •		_	11.00
<u>'</u>	·		·	1
<u>'</u>	•		•	11.00
<u>'</u>	•		=	10.53
! 	•			1
' 	5_6p5 	1	i İ	i
i	i I	i	i I	i
80	Very limited	İ	Very limited	i
	Depth to	11.00	Seepage	11.00
I	·			11.00
i	Slow water		·	i
I	movement	i	i I	i
	I	1	l	1
	I	1	l	1
90	Very limited	1	Very limited	1
	Ponding	1.00	Ponding	1.00
	Depth to	1.00	Depth to	1.00
	saturated zone	1	saturated zone	1
	Slow water	0.47	Seepage	0.53
	movement	1	I	1
	l	1	l	1
	l	1	l	1
80	Very limited	1	Very limited	1
	Depth to	1.00	Depth to	1.00
ı	cemented pan	1	cemented pan	1
l				
 	Depth to	1.00	Depth to	1.00
   	_		Depth to saturated zone	1.00 
 	Depth to		saturated zone	
	85 85 85 80	Ponding   Depth to   saturated zone   Slow water   movement	Ponding   1.00   Depth to   1.00   saturated zone   Slow water   0.47   movement	Ponding   1.00   Flooding   Depth to   Saturated zone   part of the

Table 10.—Sewage Disposal—Continued

Depth to	
Lupton	Value
Ponding	
Depth to	
saturated zone     content     Subsidence     1.00   Depth to     Seepage   Note   1.00   Saturated zone     Seepage	1.00
Subsidence	1.00
Seepage, bottom   1.00   Saturated zone   layer   Seepage   Seepage	
layer   Seepage	1.00
Cathro	
Cathro	1.00
Depth to   1.00   Organic matter   saturated zone   content   Slow water   0.72   Depth to   saturated zone   saturated zone   saturated zone   saturated zone   Seepage	
saturated zone   content     Slow water   0.72   Depth to     movement   saturated zone     Seepage	1.00
Slow water	1.00
movement   Saturated zone   Seepage	
Tawas	1.00
Tawas	
Tawas	1.00
Depth to   1.00   Organic matter     saturated zone   content     Subsidence   1.00   Seepage       Seepage, bottom   1.00   Depth to     layer   saturated zone	
	1.00
Subsidence   1.00   Seepage	1.00
layer   saturated zone     1444425:	1.00
	1.00
Lerch	
Ponding   1.00   Ponding	
Depth to   1.00   Organic matter     saturated zone   content     Slow water   1.00   Depth to     movement   saturated zone     Seepage       layer	
saturated zone   content     Slow water   1.00   Depth to     movement   saturated zone     Seepage     1.00   Seepage       layer	1.00
Slow water   1.00   Depth to     movement   saturated zone     Seepage, bottom   1.00   Seepage       layer	1.00
movement   saturated zone     Seepage	
Seepage, bottom   1.00   Seepage	1.00
layer	1.00
Depth to   1.00   Depth to     saturated zone   saturated zone   saturated zone     Slow water   1.00   Seepage	1.00
Depth to   1.00   Depth to     saturated zone   saturated zone   saturated zone     Slow water   1.00   Seepage	
saturated zone   saturated zone     Slow water   1.00   Seepage	1 00
Slow water   1.00   Seepage	1.00
movement	0.53
Portwing  50   Very limited     Very limited	0.55
Portwing  50   Very limited     Very limited	
Depth to   1.00   Depth to	1.00
saturated zone   saturated zone	
	0.53
	0.32
Herbstor	
Herbster  30   Very limited     Very limited       Depth to       Depth to	1 00
Depth to   1.00   Depth to       saturated zone	1.00
	0.53
movement	
1444427.	
1444427:	
	1.00
· · · · · · · · · · · · · · · · · · ·	0.53
Slope     0.37	

Table 10.—Sewage Disposal—Continued

	  Pct.   of	·	ds	'   Sewage lagoon	s
and soll name		·		l Poting along and	177-1
	_	Rating class and		_	
	lunit	limiting features	<del></del>	limiting features	<u> </u>
	ı	I	1	I	1
1444428:	l	I	1	l	1
Cornucopia	80	Very limited	1	Very limited	1
	1	Slow water	1.00	Slope	1.00
	I	movement	1	Seepage	10.53
	I	Slope	1.00	l	1
	I	I -	1	I	1
1444431:	ĺ	İ	İ	i I	i
Croswell	I 82	Very limited	i	Very limited	i
	i	Depth to	11.00	•	11.00
	i	saturated zone	1	Depth to	11.00
	:	Filtering	11.00	•	
	!	•	:	•	10.00
	!	capacity		Slope	10.08
	ı		1.00	I	1
	l	layer	1	l	1
	1	I	1	I	1
1444432:	I	I	1	I	1
Gogebic	85	Very limited	1	Very limited	1
	I	Depth to	11.00	Depth to	11.00
	ĺ	cemented pan	İ	cemented pan	i
	i	Depth to	11.00	•	11.00
	i	saturated zone		saturated zone	1
	i	Slow water	11.00		0.53
	:	movement	1	Slope	10.32
	:	movement	!	1 Probe	10.52
1444425.	!	!	!	! !	!
1444435:	1 05	l Ittaana limikad	!	 	!
Iosco	85	Very limited		Very limited	
	ı	Depth to	1.00		1.00
	I	saturated zone	1	Depth to	1.00
	l	Slow water	1.00	saturated zone	1
	I	movement	1	l	1
	I	I	1	I	1
1444457:	1	I	1	I	1
Redrim	85	Very limited	1	Very limited	1
	1	Depth to bedrock	1.00	Depth to hard	1.00
	I	Seepage, bottom	11.00	bedrock	1
	1	layer	1	Seepage	11.00
	i	Slow water	0.72	Slope	0.08
	i	movement	i	Large stones	10.02
	i	İ	i		i
1444459:	i	i	i	I	i
Zeba	i 90	Very limited	i	Very limited	i
	1	Depth to	11.00	•	11.00
	:	saturated zone		· •	1
	!	•			1 00
	!	Depth to bedrock		_	11.00
	!	Slow water	10.72	•	
	ı	movement	I	Seepage	10.53
	I	I	I	Slope	10.08
	I	I	I	I	I
1444460:	I	I	1	I	1
Abbaye	55	Very limited		Very limited	1
	I	Depth to	11.00	Depth to hard	1.00
	I	saturated zone	1	bedrock	1
	I	Depth to bedrock	1.00	Depth to	11.00
	I	Slow water	0.72	_	i
	ı	movement	1	Seepage	0.53
	i		i	Slope	10.08
	i	i	i		1
	1	I .	1	I	1

Table 10.—Sewage Disposal—Continued

	Pct.   of	Septic tank   absorption fields		Sewage lagoons	
and boll name		Rating class and		l Pating class and	17721110
	_	limiting features		limiting features	
144460	!	!	I	!	Ţ
1444460: Lapoin	. I 40	  Vorm limited	!	  Norr limited	!
паротп	1 40	Very limited   Depth to	  1.00	Very limited   Depth to hard	11.00
	-	saturated zone		bepth to hard   bedrock	1
	i .	Slow water	•	Depth to	11.00
	i	movement		saturated zone	1
	i	Depth to bedrock	•		0.53
	1	I	I	Slope	10.08
1444461:		 		 	1
	ו - ו 55	  Very limited	i	  Very limited	i
2	i	Depth to	11.00	=	11.00
	i	saturated zone	i	bedrock	i
	1	Depth to bedrock	1.00	Depth to	11.00
	1	Slow water	0.72	saturated zone	1
	1	movement	1	Seepage	10.53
	!		1	Slope	10.08
Zeba	I -I 40	  Very limited	¦	  Very limited	1
	i	Depth to	11.00	=	11.00
	i	saturated zone	i	bedrock	i
	1	Depth to bedrock	11.00	Depth to	11.00
	1	Slow water	0.72	saturated zone	1
	1	movement	1	Seepage	10.53
		1	1	Slope	10.08
1444477:	i	i I	i	' 	i
Cublake	-  35	Very limited	1	Very limited	1
	1	Depth to	1.00		1.00
	I	saturated zone	1	Depth to	10.75
	!	Slow water	10.72	•	1
	1	movement		Slope 	0.08 
Croswell	-   20	  Very limited	i	Very limited	i
	1	Depth to	1.00	Seepage	11.00
	1	saturated zone	1	Depth to	1.00
	1	Filtering	1.00		1
	!	capacity	•	Slope	10.08
	-	Seepage, bottom   layer	11.00	 	!
	i		i	i I	i
Ashwabay	-  20	Very limited	1	Very limited	1
	I	Depth to	1.00	Seepage	11.00
	1	saturated zone		Depth to	10.19
	!	Slow water	1.00		10.00
	1	movement		Slope 	0.08 
1444478:	i	İ	i	İ	i
Cublake	-  35	•		Very limited	
	!	Depth to	11.00		11.00
	1	saturated zone	10 72	Slope	11.00
	1	Slow water   movement	10.72	Depth to   saturated zone	10.75
	1	Slope	  0.37		
	i		1	i I	i
		•		•	

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct.  Of	Septic tank   absorption fiel	.ds	Sewage lagoons		
		Rating class and		Rating class and	Value	
	unit	limiting features	1	limiting features	<u> </u>	
	!	!	!	!	1	
1444478:	1	 	!		!	
Croswell	20	Very limited		Very limited	11 00	
	!	Depth to   saturated zone	1.00 	Seepage   Depth to	1.00  1.00	
	i	Filtering	11.00	•	1	
	i	capacity	1	Slope	11.00	
	i	Seepage, bottom		•	i	
	I	layer	1	I	1	
	I	Slope	0.04	I	1	
	1	I	1	I	I	
Ashwabay	20	Very limited		Very limited		
	!	Depth to	1.00	·	1.00	
	!	saturated zone	11 00	Slope	11.00	
	!	Slow water   movement	11.00	Depth to   saturated zone	10.75	
	i	Slope	10.37	•	i	
	i		1	i I	i	
1444479:	i	İ	i	İ	i	
Morganlake	85	Very limited	1	Very limited	1	
	I	Depth to	1.00	·	1.00	
	1	saturated zone		Depth to	10.99	
	!	Slow water	11.00	•	1	
	!	movement		Slope 	10.08	
1444480:	i	! 	i	! 	i	
Morganlake	85	Very limited	i	Very limited	i	
	I	Depth to	1.00	Seepage	1.00	
	I	saturated zone	1	Slope	1.00	
	I	Slow water	1.00	Depth to	10.99	
	!	movement		saturated zone	!	
	!	Slope	10.37	 	1	
1444481:	i	! 	i	! 	i	
Kellogg	35	Very limited	Ì	Very limited	İ	
	I	Depth to	11.00	Seepage	1.00	
	I	saturated zone	1	Depth to	10.99	
	1	Slow water	11.00			
	!	movement	!	Slope	10.32	
Allendale	ı I 25	  Very limited	<u> </u>	  Very limited	<u> </u>	
	i	Depth to	11.00	_	11.00	
	ĺ	saturated zone	Ì	Depth to	11.00	
	I	Slow water	11.00	saturated zone	1	
	1	movement	1	Slope	10.32	
3 above bear	1		!		!	
Ashwabay	1 20 1	Very limited   Depth to	1	Very limited   Seepage	1	
	<u> </u>	saturated zone	1	Slope	10.32	
	i	Slow water	11.00	•	0.19	
	i	movement	i	saturated zone	1	
	I	I	1	I	1	
1444482:		1	!	]	1	
Kellogg	40	Very limited		Very limited	11 00	
	I I	Depth to	11.00	·	11.00	
	1	saturated zone   Slow water	  1.00	Slope   Depth to	1.00  0.99	
	i	movement	1	saturated zone	10.99	
	į	Slope	0.37	•	i	
	1	i -		i İ	i	

Table 10.—Sewage Disposal—Continued

	Pct.  Of		ds	   Sewage lagoon 	ıs
	map  unit	Rating class and   limiting features		Rating class and   limiting features	•
1444482: Allendale	   25           	Depth to Saturated zone Slow water movement	         1.00     1.00     1.00	Depth to   saturated zone   Slope	      1.00  1.00    1.00
Ashwabay	20           	saturated zone Slow water movement	  1.00    1.00    1.00	Very limited   Seepage   Slope   Depth to   saturated zone	  1.00  1.00  0.19 
1444486: Sedgwick	   50       	saturated zone	    1.00    1.00	saturated zone	  1.00    0.53  0.08
Munuscong	   30           	Depth to saturated zone	  1.00  1.00      1.00	Seepage   Depth to	  1.00  1.00  1.00
1444487: Superior	   50       	saturated zone	    1.00    1.00	saturated zone	  1.00    0.53  0.32
Sedgwick	   30         	saturated zone	  1.00    1.00 	  Very limited   Depth to   saturated zone   Seepage   Slope	  1.00    0.53  0.08
1444488: Superior	50   1     	Depth to   saturated zone   Slow water   movement	11.00	saturated zone   Slope   Seepage	  1.00    1.00  0.53
Sedgwick	30           	saturated zone   Slow water	  1.00    1.00  1	saturated zone	  1.00    1.00  0.53
1444489: Sultz	35         	Slow water   movement	1.00  0.47 	•	  1.00  1.00

Table 10.—Sewage Disposal—Continued

	Pct.   of	Septic tank absorption fiel	.ds	Sewage lagoon 	ıs
		Rating class and		l Rating class and	Value
	-	limiting features		limiting features	
	!	!	1	!	1
1444489:	•		!	 	!
Ashwabay	25	Depth to		Very limited   Slope	  1.00
	<u> </u>	saturated zone		Stope   Seepage	11.00
	i	Slow water	•	Depth to	10.19
	i	movement	1	saturated zone	1
	i	Slope	11.00	İ	i
Rubicon	20	  Very limited	1	  Very limited	1
Rubicon		Filtering	11.00	· •	11.00
	i	capacity	1	Seepage	11.00
	i	Slope	11.00	·	1
	i	Seepage, bottom	11.00	•	i
	i	layer	i	İ	i
1444492:	 	 	1	 	1
	I 40	  Very limited	i	  Very limited	i
		Slow water	11.00	· •	11.00
	i	movement	i	Seepage	11.00
	I	Slope	11.00	!	1
Kellogg	I I 30	  Very limited	1	  Very limited	1
		Depth to		Slope	11.00
	i	saturated zone		Seepage	11.00
	i	Slow water	•	Depth to	0.99
	I	movement	1	saturated zone	1
	!	Slope	11.00	! :	1
Ashwabay	l l 20	  Very limited		  Very limited	
-		Depth to	11.00	•	11.00
	i	saturated zone	i	Seepage	11.00
	I	Slow water	11.00	Depth to	0.19
	I	movement	1	saturated zone	1
		Slope	11.00		1
1444506:	 	! 	i	! 	;
Keweenaw	60	Very limited	1	Very limited	1
	I	Seepage, bottom	1.00	Seepage	1.00
		layer	1	Slope	10.32
Rubicon	30	  Very limited	i	  Very limited	i
	I	Filtering	1.00	Seepage	1.00
	I	capacity	1	Slope	10.08
	I	Seepage, bottom	1.00	I	1
		layer	1	<u> </u>	1
1444507:	<u>'</u>	' 		! 	
Keweenaw	60	Very limited		Very limited	
	1	Seepage, bottom	11.00	·	11.00
	I	layer	10 16	Slope	1.00
	I I	Slope 	0.16 	 	
Rubicon	30	  Very limited	•	  Very limited	i
	l	Filtering	11.00	=	11.00
	l	capacity	I	Slope	11.00
	l	Seepage, bottom	1.00	l	I
	!	layer		! :	1
	1	Slope	10.37	 	1
	I	I	1	I	I

Table 10.—Sewage Disposal—Continued

	Pct.  Of	·		Sewage lagoons 	
	map	· —————	Value	Rating class and limiting features	Value
1444585: Meehan, beaches	   90             	  Very limited   Depth to   saturated zone   Filtering   capacity   Seepage, bottom   layer	    1.00    1.00    1.00	Depth to	    1.00  1.00   
1444586: Wurtsmith, beaches	90             	  Very limited   Depth to   saturated zone   Filtering   capacity   Seepage, bottom   layer	    1.00    1.00    1.00	Depth to	    1.00  1.00   
1444587: Grayling, beaches	95         	  Very limited   Filtering   capacity   Seepage, bottom   layer	    1.00    1.00	  Very limited   Seepage   Slope   	    1.00  1.00
1529830: Meehan, beaches	   90             	  Very limited   Depth to   saturated zone   Filtering   capacity   Seepage, bottom   layer	  1.00    1.00    1.00	  Very limited   Seepage   Depth to   saturated zone   	  1.00  1.00     
1700372: Loxley	   40           	Very limited   Ponding   Depth to   saturated zone   Subsidence   Seepage, bottom   layer	      1.00  1.00    1.00  1.00	Organic matter   content   Seepage	   1.00  1.00   1.00   1.00
Beseman	   30           	  Very limited   Ponding   Depth to   saturated zone   Slow water   movement   Subsidence	  1.00  1.00    1.00    1.00	Organic matter content Depth to saturated zone	  1.00  1.00    1.00 
Dawson	   28                 		1.00  1.00    1.00  1.00    0.47	Organic matter   content   Seepage	  1.00  1.00    1.00  1.00 

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	Pct.			Sewage lagoons 	
	_	Rating class and limiting features		Rating class and   limiting features	
1700373:	 	 	 	 	1
Rifle	90	Very limited	1	Very limited	1
	I	Ponding	1.00	Ponding	11.00
	I	Depth to	1.00	Organic matter	1.00
	I	saturated zone	1	content	1
	I	Seepage, bottom	1.00	Seepage	1.00
	 	layer 	 	Depth to   saturated zone	1.00 
1700374:	İ	  -	İ	 	İ
Allendale	! ! 35	  Very limited	i	  Very limited	<u> </u>
HITEHAATE	1 33	Depth to	11.00	•	11.00
	i	saturated zone	1	Depth to	11.00
	i	Slow water	11.00	· -	1
	i	movement	1	Slope	0.08
Wakeley	1 30	  Very limited	 	  Very limited	1
wakerey	1 30	Ponding	1.00	•	11.00
	i	Depth to	11.00		11.00
	i	saturated zone	1	content	1
	i	Slow water	11.00	•	11.00
	i	movement	i	Depth to	11.00
	į	İ	į	saturated zone	į
Kinross	I I 20	  Very limited	1	  Very limited	1
	i	Ponding	11.00	•	11.00
	I	Depth to	1.00	Organic matter	11.00
	I	saturated zone	1	content	1
	I	Filtering	1.00	Seepage	1.00
	I	capacity	1	Depth to	1.00
	 	Seepage, bottom   layer	1.00 	saturated zone 	
1702605:		! 		I 	i
Menominee	85	Very limited		Very limited	1
	!	Slope	11.00	•	11.00
	 	Slow water   movement	1.00 	Seepage 	1.00 
1702606:		 	1	 	1
Deerton	50	  Very limited	i	  Very limited	i
	1	Depth to bedrock	•		11.00
	İ	Slow water	0.72	bedrock	İ
	I	movement	1	Seepage	11.00
		<u> </u>	1	Slope	10.08
Brownstone	40	  Very limited		  Very limited	
	Į.	Seepage, bottom	11.00	Depth to hard	11.00
	!	layer	11 00	bedrock	11 00
	1	Depth to bedrock			11.00
	1	Slow water   movement	10.72		0.87  0.08
		Large stones	  0.39	Slope 	
1702607:	1	 	1	 	1
Deerton	50	  Very limited	i	  Very limited	i
	1	Depth to bedrock	1.00	Depth to hard	11.00
	•				
	i	Slow water	0.72	bedrock	I
	i I	Slow water   movement   Slope	0.72    0.37	Seepage	  1.00  1.00

Table 10.—Sewage Disposal—Continued

Map unit symbol and soil name	  Pct.   of			Sewage lagoons	
332 332	map	· —————		Rating class and	Value
		limiting features		limiting features	
	!	!	1	!	!
1702607:	1	l	!	l	!
Brownstone	40	Very limited	•	Very limited	1 00
	!	Seepage, bottom	11.00		11.00
	!	layer		bedrock	
	1	Depth to bedrock	•		11.00
	1	Slow water	10.72		11.00
	I	movement	1	Large stones	0.87
	I	Large stones	10.39	I	1
	1	Slope	0.37	I	1
	I	I	1	I	1
1702608:	1	I	1	I	1
Abbaye	90	Very limited	•	Very limited	1
	I	Depth to	1.00	, <u>_</u>	1.00
	I	saturated zone	1	bedrock	1
	1	Depth to bedrock	1.00		1.00
	1	Slow water	10.72	saturated zone	1
	1	movement	1	Slope	1.00
	1	Slope	0.37	Seepage	0.53
	1	I	1	I	1
1711685:	1	I	1	I	1
Cublake	50	Very limited	1	Very limited	1
	1	Depth to	1.00	Seepage	1.00
	1	saturated zone	1	Depth to	10.75
	1	Slow water	10.72	saturated zone	1
	1	movement	1	Slope	10.08
	1	I	1	I	1
Keweenaw	30	Very limited	1	Very limited	1
	1	Seepage, bottom	1.00	Seepage	1.00
	I	layer	1	Slope	10.32
	1	I	1	I	1

Table 11.-Source of Gravel and Sand

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The ratings given for the thickest layer are for the thickest layer above and excluding the bottom layer. The numbers in the value columns range from 0.00 to 0.99. The greater the value, the greater the likelihood that the bottom layer or thickest layer of the soil is a source of sand or gravel. See text for further explanation of ratings in this table)

Map unit symbol and soil name	Pct.  Gravel source   of		Sand source		
and soff name		Rating class and	IValue	l Rating class and	I Va l 11e
		limiting features			
	ī		ī	 	ī
433292:	1	I	1	I	1
Lerch	50	•	•	Poor	1
	!			Bottom layer	10.00
	!	Thickest layer	10.00	Thickest layer	10.00
Herbster	1 35	ı I Poor	<u> </u>	  Poor	i
	•	•	•	Bottom layer	0.00
	i	·		Thickest layer	0.00
	1	I	1	I	1
433296:		<u>l</u>	1	<u> </u>	1
Cublake	35	• • •	•	Fair	1
	!	·		Bottom layer   Thickest layer	10.00
	!	inickest layer	10.00	Inickest layer	10.30
Croswell	1 20	  Poor	i	  Good	i
	i	Bottom layer		Bottom layer	0.86
	İ	Thickest layer	0.00	<u>-</u>	İ
	I	l	1	l	1
Ashwabay	20		•	Fair	
	!	·		Bottom layer	[0.00
	!	Thickest layer	10.00	Thickest layer	0.10
433299:	i	! 	i	! 	i
Cublake	35	Poor	i	Fair	i
	İ	Bottom layer   Thickest layer	0.00	Bottom layer	0.00
	1	Thickest layer	10.00	Thickest layer	10.38
		  -	!		!
Croswell	•	•	•	Good	10.06
	!	·	10.00	Bottom layer	10.86
	i	Inickest layer	1	! 	i
Ashwabay	20	Poor	i	Fair	i
	I	Bottom layer	10.00	Bottom layer	0.00
	I	Thickest layer	10.00	Thickest layer	0.10
	1	<u> </u>	1	<u> </u>	!
433300:	1 25	 	!	   Dane	!
Kellogg			•	Poor   Bottom layer	10.00
	i			Thickest layer	10.00
	i	l	1	 	1
Allendale	25	Poor	I	Fair	I
	1			Bottom layer	10.00
	I	Thickest layer	10.00	Thickest layer	10.02
3 about book	1	 	1	   Tanin	!
Ashwabay	:	[	•	Fair   Bottom layer	10.00
		·		Bottom layer   Thickest layer	10.10
	i	l	1	lrowene rader	1

Table 11.—Source of Gravel and Sand—Continued

	  Pct.   of	•		   Sand source		
		Rating class and limiting features		Rating class and limiting features	•	
433301: Kellogg	     40 	Bottom layer	0.00	    Poor   Bottom layer   Thickest layer	      0.00  0.00	
Allendale	   25   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.00  0.02	
Ashwabay	   20   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	  0.00  0.10	
433304: Sedgwick	     50   	Bottom layer	0.00	  Poor   Bottom layer   Thickest layer	10.00	
Munuscong	   30   	Bottom layer	0.00	  Poor   Bottom layer   Thickest layer	10.00	
433305: Superior		Bottom layer	0.00	    Poor   Bottom layer   Thickest layer	      0.00  0.00	
Sedgwick		Bottom layer	  0.00	  Poor   Bottom layer   Thickest layer 	    0.00  0.00	
433309:		! 	i	! 	i	
Superior	50   	Bottom layer	0.00	Poor   Bottom layer   Thickest layer	  0.00  0.00	
Sedgwick	30     	•	0.00	  Poor   Bottom layer   Thickest layer 	  0.00  0.00	
433310: Sultz	   35   	· -	10.00	  Fair   Bottom layer   Thickest layer	    0.05  0.66	
Ashwabay	   25   	Bottom layer	10.00	Thickest layer	  0.00  0.10	
Rubicon	   20     	Bottom layer	•	•	    0.82 	
433314: Manistee	   40     	Thickest layer	      0.00  0.00	•	    0.00  0.04	

Table 11.—Source of Gravel and Sand—Continued

	  Pct.   of			   Sand source		
	map	Rating class and limiting features		Rating class and limiting features		
433314: Kellogg	     30   	Bottom layer	0.00	    Poor   Bottom layer   Thickest layer	      0.00  0.00	
Ashwabay	   20   	Bottom layer	10.00	  Fair   Bottom layer   Thickest layer	    0.00  0.10	
433326: Rubicon	     85   	·	      0.00  0.00	•	      0.82	
433379: Allendale	     80   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	1 1 1 0.00 1 0.02	
433515: Lupton	   40       	Bottom layer Thickest layer	0.00  0.00	  Poor   Bottom layer   Thickest layer   Organic matter   content	    0.00  0.00  0.00	
Cathro	:	_	0.00	  Fair   Thickest layer   Bottom layer	    0.00  0.03	
Tawas	   25     	Bottom layer	0.00	  Fair   Thickest layer   Bottom layer 	    0.00  0.20	
433572: Portwing	   50   	Bottom layer	0.00	  Poor   Bottom layer   Thickest layer	    0.00  0.00	
Herbster	   30   	Bottom layer	0.00	  Poor   Bottom layer   Thickest layer 	    0.00  0.00	
433573: Cornucopia	   80   	Bottom layer	      0.00  0.00	·	    0.00  0.00	
433582: Croswell	     82   	Bottom layer	      0.00  0.00	•	      0.86	
433599: Annalake	     85     	·	      0.00  0.00	•	      0.00  0.10	

Table 11.-Source of Gravel and Sand-Continued

	  Pct.   of			   Sand source 		
	map	Rating class and limiting features		Rating class and limiting features		
433600: Annalake	     80   	·	0.00	    Fair   Bottom layer   Thickest layer	      0.00  0.10	
433671: Arnheim	     85   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	      0.00  0.06	
433676: Redrim	•	Thickest layer	0.00	  Fair   Bottom layer   Thickest layer	    0.08  0.29	
433679: Lapoin		Bottom layer	0.00	  Fair   Thickest layer   Bottom layer	    0.00  0.03	
433686: Zeba	     90   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.04  0.10	
433729: Sultz	     85   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.05  0.66	
433739: Moquah		Bottom layer	0.00	  Fair   Thickest layer   Bottom layer	    0.00  0.22	
433771: Beaches	     97	    Not rated	 	    Not rated	<u> </u>	
433802: Udorthents, ravines and escarpments		      Not rated	     	      Not rated	     	
452739: Water	     100	    Not rated	 	    Not rated	<u> </u>	
452765: Abbaye	     55   	·	0.00	  Fair   Bottom layer   Thickest layer	      0.03  0.12	
Lapoin	   40   	·	0.00	  Fair   Thickest layer   Bottom layer	    0.00  0.03	
1383557: Au Gres	     85     	Thickest layer		  Fair   Bottom layer   Thickest layer 	      0.86  0.98	

Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	  Pct.   of	•		   Sand source 	
		Rating class and limiting features		Rating class and   limiting features	Value 
1383580:	 	 	 	 	 
Loxley	40	Poor	İ	Poor	İ
	I	Bottom layer	10.00	Bottom layer	10.00
	!	Thickest layer	10.00	•	10.00
		Organic matter   content	0.00 	Organic matter   content	0.00 
Beseman	I I 30	  Poor	 	  Poor	1
	•	Bottom layer	0.00		0.00
	 	Thickest layer	0.00 	Thickest layer	10.00
Dawson	28	Poor	i	'  Fair	i
	I	Thickest layer	10.00	Thickest layer	10.00
	 	Bottom layer	0.00 	Bottom layer 	0.65 
1383581:	!		į	 	į
Rifle	1 90	Poor   Bottom layer	10.00	Poor   Bottom layer	10.00
	i	Thickest layer	10.00	•	10.00
	i	Organic matter	0.00	•	0.00
	İ	content	İ	content	İ
1383603:			į	' 	į
Cornucopia	80			Poor	1
		Bottom layer   Thickest layer	10.00	Bottom layer   Thickest layer	0.00  0.00
1383658:	 	 	 	 	1
Deerton	50	Poor	i	  Fair	i
	I	Bottom layer	10.00	Bottom layer	10.00
	1	Thickest layer	0.00 	Thickest layer 	0.91 
Brownstone	40	Poor	i	  Fair	i
	I	Thickest layer		Bottom layer	10.00
	 	Bottom layer	0.00 	Thickest layer 	0.09 
1383660:	l I 50	I Boom		 	İ
Deerton	1 30	Bottom layer	•	Fair   Bottom layer	10.00
	i	Thickest layer	10.00	_	0.91
Brownstone	   40	  Poor	 	  Fair	1
	I	Thickest layer	0.00	Bottom layer	0.00
	1	Bottom layer	0.00 	Thickest layer 	0.09 
1383662:		<u>.</u>	į	i	į
Abbaye	90	Poor	•	Fair	10.04
	 	Bottom layer   Thickest layer	0.00  0.00	•	0.04  0.11
	i		İ	 	İ
1383665: Allendale	   35	  Poor	 	  Fair	I I
	, 55 I	Bottom layer	0.00		0.00
	İ	Thickest layer	0.00	· -	0.02
Wakeley	   30	  Poor		  Poor	
_	I	Bottom layer	0.00		0.00
	 	Thickest layer	0.00 	Thickest layer	10.00
Kinross	20	  Poor	i	  Fair	
	I	Bottom layer	0.00	•	10.65
		Thickest layer	10.00	Thickest layer	0.99

Table 11.—Source of Gravel and Sand—Continued

	  Pct.   of	   Gravel source 		Sand source		
	_	Rating class and   limiting features		Rating class and   limiting features		
1383960: Flink	     75   	Bottom layer	0.00	    Fair   Bottom layer   Thickest layer	      0.00  0.18	
1444357: Arnheim		Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	      0.00  0.06	
1444359: Beaches	     97	    Not rated 	 	    Not rated 		
1444367: Udorthents, ravines and escarpments		  -    Not rated 	     	 	       	
1444378: Wakefield	   85   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.01  0.07	
1444379: Wakefield	•	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.01  0.07	
1444388: Allendale	     80   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
1444402: Tonkey	     90   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	10.00	
1444410: Tula	   80     	Bottom layer	0.00	  Fair   Thickest layer   Bottom layer 	    0.04  0.05	
1444414: Lupton	40       	Bottom layer   Thickest layer	0.00	  Poor   Bottom layer   Thickest layer   Organic matter   content	    0.00  0.00  0.00	
Cathro	   30 	·	0.00	  Fair   Thickest layer   Bottom layer	    0.00  0.03	
Tawas	•	Thickest layer	  0.00  0.00	  Fair   Thickest layer   Bottom layer 	    0.00  0.20	

Table 11.—Source of Gravel and Sand—Continued

and soil name	of			Sand source 		
		Rating class and limiting features				
1444425:	 	 	 	 	 	
Lerch	•	•		Poor	1	
	   			Bottom layer   Thickest layer 	0.00  0.00	
Herbster	I 35	l Poor	i i	  Poor	i	
	•	Bottom layer	0.00	Bottom layer   Thickest layer	0.00	
1444426:	i	! 	İ	! 	i	
Portwing			I	Poor	1	
	 			Bottom layer   Thickest layer 	10.00	
Herbster	30	  Poor	! 	  Poor	i	
	ĺ	·		Bottom layer	10.00	
	 	Thickest layer 	0.00 	Thickest layer 	0.00 	
1444427:		l	!	I	!	
Cornucopia				Poor   Bottom layer	1	
	i			Thickest layer	10.00	
1444400	!	<u> </u>	!	<u> </u>	!	
1444428: Cornucopia	I I 80	  Poor	l I	  Poor	1	
001u00F1u				Bottom layer	0.00	
		Thickest layer	10.00	Thickest layer	10.00	
1444431:	i	! 		' 	i	
Croswell	•	•		Good	1	
		·	10.00	Bottom layer 	0.86 	
1444432:		  -		  -		
Gogebic	l   85	  Poor	! 	।  Fair	i	
-	ĺ			Bottom layer	0.01	
	 	Thickest layer 	0.00 	Thickest layer 	0.10 	
1444435:	i	İ	i	İ	i	
Iosco		Poor		Fair	10.00	
	 	·		Bottom layer   Thickest layer	0.00  0.04	
	į	<u>-</u>	İ	_	į	
1444457: Redrim	   85	  Poor	1	  Fair		
Rediim	1 03		0.00	•	0.08	
	İ		0.00	<del>-</del>	0.29	
1444459:	i	 	 	 	i	
Zeba	90	Poor		Fair		
		·	0.00  0.00	•	0.04  0.10	
	i					
1444460:		   Boom		  Paim	1	
Abbaye	, 55 	Poor   Bottom layer	•	Fair   Bottom layer	I  0.03	
	i			Thickest layer	0.12	
I anoin	1 40	   Boom		  Paim	1	
Lapoin	4±0 	Poor   Bottom layer	I  0.00	Fair   Thickest layer	10.00	
	I	_	0.00	•	10.03	
	I	I	I	I	1	

Table 11.—Source of Gravel and Sand—Continued

	  Pct.   of	   Gravel source 		   Sand source 	Sand source		
		Rating class and limiting features					
	1	IIMICING TEACUTES	<u>'</u>	l timicing reacures	<del></del>		
1444461:	i		i		i		
Abbaye		   Bottom laver	10.00		  0.03  0.12		
Zeba	İ	Bottom layer   0.		·	  0.04  0.10		
1444477:	 	 	! !	 	1		
Cublake				  Fair	i		
		Bottom layer   Thickest layer			0.00  0.38		
Croswell	20	  Poor	i	  Good	i		
		Bottom layer   Thickest layer	10.00	·	0.86 		
Ashwabay	I I 20	l I Poor	 	  Fair	1		
Ashwabay		Bottom layer	0.00	Bottom layer	0.00		
1444478:	! 	! 	! !	 	i		
Cublake		Poor   Bottom layer   Thickest layer		Fair   Bottom layer	  0.00		
	!	Thickest layer	10.00	Thickest layer	10.38		
Croswell	İ	Bottom layer		Bottom layer	    0.86		
		Thickest layer	10.00	1	!		
Ashwabay	İ	Bottom layer		Bottom layer	1 10.00		
		Thickest layer	10.00	Thickest layer	0.10		
1444479: Morganlake			•	    Fair	   		
		- <u>-</u>		•	0.00  0.01 		
1444480:	ĺ	l	ĺ	l	İ		
Morganlake		Bottom layer			  0.00  0.01		
1444481:	 	 	 	 	 		
Kellogg	35	Poor		Poor	1		
	   	· •	0.00  0.00	Bottom layer   Thickest layer 	0.00  0.00		
Allendale	25	  Poor	i	,  Fair	i		
	ļ.	· •		Bottom layer	0.00		
	i I	Thickest layer 	0.00 	Thickest layer 	10.02		
Ashwabay	20	  Poor	i	ı  Fair	i		
-	I	Bottom layer	0.00	·	0.00		
	l I	Thickest layer 	0.00 	Thickest layer 	0.10 		

Table 11.—Source of Gravel and Sand—Continued

	  Pct.   of			   Sand source 			
	-	Rating class and limiting features		Rating class and   limiting features			
1444482:		] 			I		
Kellogg	   40   	Bottom layer	0.00	  Poor   Bottom layer   Thickest layer	10.00		
Allendale	   25   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.00  0.02		
Ashwabay	   20   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.00  0.10		
1444486:	İ	! 	İ	! 	i		
Sedgwick		Bottom layer	0.00	Poor   Bottom layer   Thickest layer	  0.00  0.00		
Munuscong	   30   	Bottom layer	0.00	  Poor   Bottom layer   Thickest layer	10.00		
1444487: Superior		Bottom layer	10.00	    Poor   Bottom layer   Thickest layer	      0.00  0.00		
Sedgwick		  Poor   Bottom layer	10.00	  Poor   Bottom layer   Thickest layer	    0.00  0.00		
1444488:	 	 		 	1		
Superior		Bottom layer	0.00	Poor   Bottom layer   Thickest layer	10.00		
Sedgwick		Bottom layer	0.00	  Poor   Bottom layer   Thickest layer	10.00		
1444489: Sultz	     35   	· •	0.00	  Fair   Bottom layer   Thickest layer	    0.05  0.66		
Ashwabay	   25   	Bottom layer	0.00	  Fair   Bottom layer   Thickest layer	    0.00  0.10		
Rubicon	   20   	Bottom layer	    0.00  0.00	•	    0.82 		
1444492: Manistee	   40     	Thickest layer	0.00 10.00	  Fair   Bottom layer   Thickest layer 	      0.00  0.04		

Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	Pct.  Of			   Sand source 		
		Rating class and limiting features		Rating class and   limiting features		
1444492:	 	 	 	 		
Kellogg	•	Poor	•	Poor	1	
	 			Bottom layer   Thickest layer	10.00	
Ashwabay	1 20	  Poor	<u> </u>	  Fair	i	
•	•	Bottom layer	0.00	Bottom layer   Thickest layer	0.00  0.10	
1444506:	į	 		 	I	
	60	  Poor	i	'  Fair	i	
	•	•	•	Bottom layer	0.10	
	 		0.00 	Thickest layer 	0.49 	
Rubicon	30	•	•	  Good	i	
	 	· -	0.00  0.00	Bottom layer 	0.82 	
1444507:	 	 	 	 	1	
Keweenaw	60	Poor	i	Fair	i	
	1	·		Bottom layer	10.10	
	 	Thickest layer 	0.00 	Thickest layer 	0.49 	
Rubicon	30			Good	i	
		· -	0.00  0.00	Bottom layer	10.82	
	i	Inickest layer	l	! 		
1444585: Meehan, beaches	l 1 90	  Poor	 	  Fair	1	
neenan, beaches			•	Bottom layer	0.82	
	1	Thickest layer	0.00	Thickest layer	0.99	
1444586:	į	! 				
Wurtsmith, beaches				Good   Bottom layer	  0.82	
		· -	10.00	· •	0.62	
1444587:	 	 	 	 	1	
Grayling, beaches	95		•	Fair	10.64	
	1	•	10.00	Bottom layer   Thickest layer	0.64  0.99	
150000	į					
1529830: Meehan, beaches	I I 90	  Poor	 	  Fair	1	
,	İ		0.00		0.82	
	 	Thickest layer 	0.00 	Thickest layer 	0.99 	
1700372:		!	į	! 	į	
Loxley	40	Poor		Poor	10 00	
		· -	0.00  0.00	· •	0.00  0.00	
	i	— — — — — — — — — — — — — — — — — — —	0.00	·	0.00	
	 	content	 	content 	1	
Beseman	30	  Poor	•	  Poor	i	
	1		10.00	· •	[0.00	
		Thickest layer 	0.00 	Thickest layer 	0.00 	
Dawson	28	Poor	•	Fair		
	1	·	0.00  0.00	·	0.00  0.65	
	1	Bottom layer		Bottom layer 	10.65	

Table 11.—Source of Gravel and Sand—Continued

Map unit symbol and soil name	  Pct.   of	   Gravel source 		Sand source		
		Rating class and		_		
	unit	limiting features	<u>!</u>	limiting features	<u>!</u>	
1700373:	1	 	1			
	90	  Poor	i	Poor	i	
	•	•	•	Bottom layer	0.00	
	I	Thickest layer	10.00	Thickest layer	10.00	
	!	•		Organic matter	[0.00	
	!	content	!	content	!	
1700374:	i	i	i		i	
Allendale	35	•	1	Fair	1	
	:			· -	10.00	
		Thickest layer	[0.00	Thickest layer	10.02	
Wakeley	1 30	  Poor	i	  Poor	i	
-			0.00	Bottom layer	0.00	
	I	Thickest layer	10.00	Thickest layer	10.00	
		<u> </u>	!	! 	1	
Kinross	•	•	•	Fair	10 65	
	1	· –		· -	0.65  0.99	
	i	Inickest layer	1	Inickest layer	1	
1702605:	İ	Ī	Ì		İ	
Menominee	•	•	•	Fair	1	
	!			Bottom layer	10.00	
	1	Thickest layer	10.00	Thickest layer	10.03	
1702606:	i		i		i	
Deerton	50			Fair	1	
	1	•		·	[0.00	
		Thickest layer	10.00	Thickest layer	0.91	
Brownstone	1 40	Poor	i	  Fair	i	
			0.00	Bottom layer	0.00	
	1	Bottom layer	10.00	Thickest layer	10.09	
1702607:					1	
Deerton	I I 50	  Poor	<u> </u>	  Fair	i	
	•	Bottom layer		Bottom layer	0.00	
	I	Thickest layer	10.00	Thickest layer	0.91	
B	1	 	!	   = : 1 : :	!	
Brownstone	•	•	•	Fair   Bottom layer	10.00	
	i	Bottom layer		Thickest layer	10.09	
	i	i İ	i	- 	i	
1702608:		   Table   1	1		!	
Abbaye	1 90	Poor	  0.00	Fair	  0.04	
	;	Bottom layer   Thickest layer		Bottom layer   Thickest layer	0.04	
	i		1		1	
1711685:	1	I	1	l	1	
Cublake	50	Poor		Fair	1	
	!	Bottom layer	10.00	·	10.00	
		Thickest layer 	0.00 	Thickest layer 	0.38 	
Keweenaw	30	Poor	i	Fair	i	
	1	Bottom layer	10.00	·	10.10	
	1	Thickest layer	10.00	Thickest layer	0.49	

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.00 to 0.99. The smaller the value, the greater the limitation. See text for further explanation of ratings in this table)

Map unit symbol and soil name	  Pct.   of	•	rial	   Roadfill sourc 	e	   Topsoil sourc 	:e
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	lunit	limiting features	1	limiting features	1	limiting features	1
	1	ļ.	1	!	1	]	1
433292:	I =0	I De con	1	I De con	!	l Danas	!
Lerch	1 50	•	•	Poor	•	Poor	10 00
	1		0.00  0.13	•	0.00  0.00		0.00  0.00
	;	organic matter	•	Shrink-swell	10.00		10.00
	i		10.84	•	1	' 	i
	i	i	1	i	i	i i	i
Herbster	35	Poor	i	Poor	i	Poor	i
	1	Too clayey	0.00	Wetness	0.00	Wetness	10.00
	I	Low content of	0.13	Shrink-swell	0.22	Too clayey	10.00
	1	organic matter	1	Dusty	0.82	l	1
	1	Too acid	0.84	<u> </u>	1	<u> </u>	1
422206	!	1	1	1	!	 	!
433296: Cublake	I I 35	ı I Poor	1	  Fair	1	  Poor	1
Cabiane	1	•	0.00	•	10.53	•	10.00
	i	•	10.00	•	I	Wetness	10.53
	i	Too acid	0.21	•	i	Too acid	0.88
	Ì	Ì	İ	İ	İ	l	İ
Croswell	20	Poor	1	Fair	I	Poor	1
	1	Too sandy	10.00	Wetness	0.53	Too sandy	10.00
	1	Wind erosion	10.00	I	1	Wetness	10.53
	I	Low content of	0.13	I	I	Rock fragments	0.97
	!	organic matter	!		!	<u> </u>	!
Ashwabay	1 20	  Poor	1	  Fair	!	  Poor	!
110111110204	1	Too sandy	0.00	•	0.89	•	10.00
	i	· -	10.00	•	10.99	· •	10.89
	i	Too acid	0.46	•	i	İ	i
	1	I	1	I	I	l	1
433299:		<u> </u>	1	!	!	<u> </u>	!
Cublake	35	•	•	Fair	•	Poor	1
	1	Too sandy	10.00	•	0.53	· -	10.00
	1	Wind erosion   Too acid	0.00  0.21		!	Wetness   Slope	0.53  0.63
	i	l 100 acid	10.21	! 	<u> </u>	l probe	10.05
Croswell	20	  Poor	i	  Fair	i	Poor	i
	1	Too sandy	0.00	Wetness	0.53	Too sandy	10.00
	1	Wind erosion	10.00	I	1	Wetness	10.53
	1	Low content of	0.13	I	I	Slope	10.96
	I	organic matter	1	<u> </u>	1	  -	!
Ashwabay	1 20	l I Poor	1	  Fair		  Poor	1
	, ~~	Too sandy	0.00	•	10.53		0.00
	i	Wind erosion	0.00		10.99		10.53
	i	Too acid	0.46		İ	Slope	10.63
	1	I	1	I	I	l	1
433300:		<u> </u>	!	<u> </u>	!	<u> </u>	!
Kellogg	35		•	Poor		Fair	10.11
	I	Wind erosion	0.00	•	10.00		0.14
	1	Too acid   Low content of	10.12	Wetness   Shrink-swell	0.14		1
	1	Low content or   organic matter	:	Shrink-swell	10.64	 	
	•	. Organic maccer	!	:	:		

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct.   of		rial	Roadfill sourc 	е	Topsoil sourc	e
	-	Rating class and limiting features		-		•	
433300:	 	 	 	 	 	 	 
Allendale	25	Poor	I	Poor	I	Poor	1
	1	Wind erosion	0.00	Wetness	10.00	Wetness	10.00
	1	Low content of	0.13	Low strength	10.00	I	1
	1	organic matter	•	•	0.71	I	I
	!	Too acid	0.54	<u> </u>	!	<u> </u>	!
Ashwabay	I I 20	l I Poor	 	  Fair		  Poor	1
nonwabay			•	•	10.89	•	10.00
	i		•	•	10.99		10.89
	i	Too acid	0.46	İ	İ	İ	i
	!	!	ļ .	!	!	!	1
433301: Kellogg	1 40	  Boom	  -	  Poor	!	  Fair	!
Reilogg			•	•	•	Wetness	10.14
	i	•		-	•	Slope	10.63
	i		•		10.64	•	1
	i	organic matter	İ	İ	İ	İ	i
		<u> </u>	ļ .	!	!	!	1
Allendale	•	•	•	Poor	•	Poor	1
	!	•	•	•	10.00	•	10.00
	!	Low content of   organic matter		•	10.00	Slope	10.96
			I  0.54	•	10.71	! !	<u> </u>
	i		•		i		i
Ashwabay	20	Poor	I	Fair	I	Poor	1
	1	•	•		0.89	Too sandy	10.00
	I	•	•	•	0.99	•	10.63
	!	Too acid	0.46		!	Wetness	10.89
433304:	<u> </u>	! 	! !	! 	<u> </u>	! 	i .
Sedgwick	50	Fair	i İ	Poor	i	Poor	i
-	Ì	Low content of	0.13	Wetness	0.00	Wetness	10.00
	1	organic matter	I	Low strength	10.00	Too clayey	10.50
	1	Too acid	0.46	Shrink-swell	0.29	I	1
	!	Too clayey	10.66	•	!	<u> </u>	!
Munuscong	I I 30	  Fair	•	  Poor		  Poor	1
Manascong			,  0.13	•	•	Wetness	10.00
	i	organic matter	•	•	0.00	•	1
	i	Carbonate content		-	0.77		i
	!	<u> </u>	ļ .	!	!	!	1
433305: Superior	.i 50	  Fair	 	  Poor		  Poor	1
Superior	1 30		0.01		  0.00		0.00
	i		0.13		10.00		0.01
	i	organic matter		_	0.23		i
	i	-	0.54		İ	İ	i
		<u> </u>	•	<u> </u>	!	<u> </u>	1
Sedgwick	30		  0.13	Poor		Poor	10.00
		low content of   organic matter	•	•	0.00  0.00		0.00  0.56
	<u> </u>	_	1  0.46	•	10.29		10.30
	i		0.74	•		i İ	i
	1	<u>l</u>	l	ļ.	Į.	ļ.	I
433309:		  Enim	l	 	!	 	!
Superior	1 20		  0.01	Poor   Wetness	  0.00	Poor   Wetness	1
	1				10.00		10.00
	i			_	10.00	·	10.63
	i	-	0.54		1	, 	1
	i	I	•	i	1	ı	i

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

	  Pct.   of	•	rial	Roadfill sourc	e	   Topsoil sourc	e
	-	Rating class and limiting features		·		•	
433309: Sedgwick	   30       	Low content of organic matter Too acid	0.13 	Low strength Shrink-swell	      0.00  0.00  0.29	Too clayey	      0.00  0.56 
433310: Sultz	   35       	Too sandy Wind erosion	0.00  0.00  0.13	•	      0.00   	  Poor   Slope   Too sandy   Rock fragments	    0.00  0.00  0.97
Ashwabay	25     	Too sandy   Wind erosion	0.00  0.00  0.46	Shrink-swell	0.08  0.89  0.99	Too sandy   Wetness	  0.00  0.00  0.89
Rubicon	•	Too sandy Wind erosion	i		•	  Poor   Slope   Too sandy   Too acid 	  0.00  0.00  0.99
433314: Manistee	   40       	Wind erosion   Low content of   organic matter	0.00  0.13	  Poor   Low strength   Slope   Shrink-swell 	•		    0.00   
Kellogg		Wind erosion   Too acid   Low content of	0.00  0.12	  Poor   Low strength   Wetness   Slope 	  0.00  0.14  0.18	Wetness	  0.00  0.14 
Ashwabay	20       	Too sandy Wind erosion	0.00  0.00	  Poor   Slope   Wetness   Shrink-swell 	  0.00  0.89  0.99	Too sandy	  0.00  0.00  0.89
433326: Rubicon	85         	Too sandy   Wind erosion	    0.00  0.00  0.13	Ì	         	  Poor   Too sandy       	    0.00     
433379: Allendale	   80       	Low content of organic matter	    0.00  0.13    0.54	Low strength   Shrink-swell	    0.00  0.00  0.71	İ	    0.00     
433515: Lupton	   40     	  Good         	 	  Poor   Wetness   Dusty 	    0.00  0.80 		    0.00  0.00

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

	  Pct.   of		rial	   Roadfill sourc 	e	   Topsoil sourc 	:e
	_	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433515: Cathro	   30   	    Fair   Too acid   	      0.99 	•	0.00  0.80	•	      0.00  0.00
Tawas	   25     	  Good     	 	•	    0.00  0.80 	•	    0.00  0.00
433572: Portwing	   50       	Too alkaline   Too clayey   Low content of	10.00	Shrink-swell	    0.00  0.34  0.82	Too clayey	    0.00  0.00
Herbster	   30       	Too clayey Low content of organic matter	0.00  0.13	Shrink-swell   Dusty	  0.00  0.22  0.82	Too clayey	  0.00  0.00
433573: Cornucopia	   80       	Too clayey	0.00  0.50	Dusty 	      0.57  0.94 	·	    0.00  0.63 
433582: Croswell	   82       	Too sandy Wind erosion	      0.00  0.00  0.13	İ	      0.53     	  Poor   Too sandy   Wetness   	    0.00  0.53 
433599: Annalake	   85       	Low content of organic matter	•	Ì	      0.89   	  Fair   Wetness   Too acid 	      0.89  0.93
433600: Annalake	•	Low content of organic matter	0.13	İ	0.89	  Fair   Slope   Wetness   Too acid	  0.63  0.89  0.93
433671: Arnheim	 	Low content of organic matter Too acid Water erosion	0.50	Dusty   	•	  Poor   Wetness   	      0.00     

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct.   of	•	rial	Roadfill sourc	e	Topsoil sourc 	e
	map	Rating class and	Value	Rating class and		=	
	lunit	limiting features	<u>!</u>	limiting features	<u>!</u>	limiting features	<u>!</u>
433676: Redrim	   85       	Too sandy	0.00  0.00 	I	•	  Poor   Too sandy   Depth to bedrock   Rock fragments 	      0.00  0.00  0.00
433679:	1	 	1	 	1	 	
Lapoin	   85       	Low content of   organic matter   Too clayey	0.00	Wetness   Shrink-swell	•	Too clayey	  0.14  0.22  0.99
433686:	i	! 	i	! ]	i		i
Zeba	90       	Wind erosion   Low content of   organic matter	0.00  0.13	Depth to bedrock	0.00		  0.00  0.79  0.97
433729:	1	! 		! 	<u> </u>	 	
Sultz	85       	Too sandy Wind erosion	  0.00  0.00  0.13	İ		Poor   Too sandy   Rock fragments   	  0.00  0.97 
433739:	1	! 	! 	! 		I 	
Moquah	85     	Low content of   organic matter	0.88	İ	  0.89   	Fair   Wetness 	  0.89   
433771: Beaches	     97	    Not rated	! ! !	    Not rated	   	    Not rated	 
433802: Udorthents, ravines	   	 	   	 		 	
and escarpments		Not rated	i	Not rated	i	Not rated	i
452739:				  -	1	 	1
Water	1 100	  Not rated	i	  Not rated	;	  Not rated	i
	1	I	I	I	I	I	1
452765: Abbaye	   55       	Low content of	0.00    0.50	Wetness	•		  0.14  0.58  0.85
Lapoin	40   40     	  Poor   Low content of   organic matter   Too clayey   Too acid 	0.00    0.31  0.50	Wetness   Shrink-swell	•	Too clayey	  0.14  0.22  0.99

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

	Pct.	•		Roadfill sourc	e	   Topsoil sourc	e
and soil name	of	reclamation mate		1		<u> </u>	
	map			Rating class and	Value	Rating class and	Value
	unit	limiting features	<u> </u>	limiting features	1	limiting features	<u> </u>
	I	I	1	I		I	1
1383557:	•	I	1	I	1	l	1
Au Gres	85	•	•	Poor	•	Poor	1
	!	Too sandy	•	•	10.00	•	10.00
	!	Wind erosion	10.00	•		Too sandy	10.00
	!		0.13	!			!
	!	organic matter	!	!	!		!
1383580:	!	1	1	1		•	!
Loxley	1 40	l Leain	1	  Poor		  Poor	!
roxteA			10.50	•	10.00	•	10.00
	:	I 100 acid	10.50	•	•	Organic matter	10.00
	:	1	<u> </u>	l Dusty		content high	10.00
	i	1	i	I		Too acid	10.13
	i	i	i	i	i	1	1
Beseman	I 30	Fair	i	  Poor	i	  Poor	i
	•	Too acid	0.61	•	•	Wetness	0.00
	i	•	10.90	•	10.80	•	10.00
	i	İ	i	i	i i	content high	i
	Ì	İ	İ	İ	i i	Too acid	10.20
	I	I	1	I	1	I	1
Dawson	28	Poor	1	Poor	1	Poor	1
	I	Too acid	10.00	Wetness	10.00	Wetness	10.00
	I	I	1	Dusty	0.80	Organic matter	10.00
	I	I	1	I		content high	1
	I	I	1	I	1	Too acid	0.13
	I	I	1	I	1	l	1
1383581:		1	1	1		<u> </u>	!
Rifle	90	Good	!	Poor	•	Poor	
	!	!	!	•	10.00	•	10.00
	!	1	1	Dusty	10.80	Organic matter	10.00
	!	1	1	1		content high	!
1383603:	!	! !	1	1	1	l I	!
Cornucopia	1 80	l Poor	<u> </u>	Poor		  Poor	;
COINGCOPIA	1		0.00	•	0.00	•	10.00
	i		10.50	·	10.57	·	10.00
	i	organic matter			10.94	·	1
	i	Too acid	0.68	•	1	I	i
	i	l	İ	i	i i	i I	i
1383658:	Ì	İ	İ	İ	i i		İ
Deerton	50	Poor	1	Poor	1	Poor	1
	I	Low content of	0.00	Depth to bedrock	0.00	Too sandy	10.00
	I	organic matter	1	I	1	Too acid	10.76
	I	Droughty	10.00	I		Rock fragments	10.88
	I	Too sandy	10.00	I	1	I	1
	1	I	1	I			1
Brownstone	40	•		Poor		Poor	1
	1	Too sandy	10.00	· -			10.00
	!	Low content of	10.00		0.13		10.00
	!	-			0.98	Depth to bedrock	10.79
	!	Droughty	0.01	I .	1	 	1
1383660:	!	 	1	I I	1	l I	1
Deerton	I 50	l Poor	1	  Poor		  Poor	1
peer con	1 30	Low content of	10.00				10.00
	;	organic matter	10.00	Septim to bearock	1	Slope	10.63
	i	Droughty	0.00	i	i	Too acid	10.76
		,	, 0.00	1		,	, 0 . , 0
	I	Too sandy	10.00	I .	1	l	1

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	  Pct.   of	reclamation mate:				   Topsoil sourc 	
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	<u> </u>	limiting features	1	limiting features	1
	1	I	I	I	1	l	1
1383660:	I	I	I	I	1	I	1
Brownstone	40	•	•	Poor	•	Poor	1
	I		10.00	·		<del>-</del>	10.00
	1			Cobble content		•	10.00
	!	organic matter			10.98	Slope	10.63
	!	Droughty	0.01	<u> </u>	!		!
1202662	1	!	!	 	!	] :	!
1383662: Abbaye	1 00	l Door	! !	l Boom	!	  Fair	!
Abbaye			1 10.00	Poor	•	•	  0.14
	1	•	10.00	· •	10.14		10.14
		organic matter	•	wechess	U.14	Depth to bedrock	
	;	•	10.50	•		Depth to Dedrock	10.71
	i	1	10.50 I	! 	<u> </u>	! 	i
1383665:	i	I		! 	i	! 	i
Allendale	I 35	Poor	i	  Poor	i	  Poor	i
	1		10.00	•	0.00	•	0.00
	i	•	•	•	0.00		i
	i	organic matter		•	0.71		i
	i	-	0.54		i	i İ	i
	Ì	Ì	ĺ	l	İ		İ
Wakeley	30	Fair	I	Poor	I	Poor	1
	1	Low content of	0.13	Wetness	0.00	Wetness	0.00
	1	organic matter	I	Low strength	10.00	l	1
	1	Too acid	0.50	Shrink-swell	0.71	l	1
	I	Carbonate content	0.95	I	1	I	1
	1	I	I	I	I	l	1
Kinross	20		•	Poor	•	Poor	1
	1	•	•	•	10.00	•	10.00
	!		10.03		!	Too sandy	10.00
	!	Droughty	0.99	<u> </u>	!	Too acid	10.93
1383960:	!	1	!	] 	!	1	!
Flink	1 75	I Door	! !	  Poor	!	  Poor	1
FIIIK	1 /5	•	1 10.00	•	10.00	•	10.00
	;	· -	10.00	•	10.00	Too sandy	10.00
	i	•	0.13		<u> </u>	Too sandy   Too acid	10.99
	i		1	' I	i	1	1
	i	l	i	i İ	i	1	i
1444357:	i	i	i	i I	i	i I	i
Arnheim	85	Fair	İ	Poor	İ	Poor	İ
	I	Low content of	0.50	Wetness	0.00	Wetness	0.00
	1	organic matter	I	Dusty	0.97	l	1
	1	Too acid	0.97	I	1	l	1
	1	Water erosion	0.99	I	1	I	1
	I	I	I	I	1	I	1
1444359:		1	!	<u> </u>	!	<u> </u>	1
Beaches	97	Not rated	!	Not rated	!	Not rated	!
1444267	!	!	ļ	<u> </u>	!	1	!
1444367:	I	1	I	 	1	1	1
Udorthents, ravines		INot mated	i i	  Not mated	1	  Not mated	1
and escarpments	1 65	INOC FALEG	! !	Not rated	1	Not rated	1
1444378:	1	! !	! !	! !	1	] 	1
Wakefield	ΙQE	l  Fair	! !	  Poor	1	  Poor	1
wavetteta	1 33 1	•	ı  0.13		10.00	•	10.00
	i		l (10.13	"ecuess	1	Rock fragments	10.88
	i	_	1 10.68	' 	i		1
		,	,	•		•	
	i	Water erosion	0.99	I	1	1	1

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct.   of	•	rial	Roadfill source   		Topsoil sourc 	e
	map  unit	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444379:		 	 	 	 	 	 
Wakefield	-   85	  Fair	İ	Poor	İ	Poor	i
	i	•	10.13	Wetness	10.00	•	10.00
	i i	organic matter	i	•	i	Slope	10.37
	i		0.68	i İ	i	Rock fragments	0.88
	i	Water erosion	0.99	İ	i	İ	i
	1		Ì	İ	İ	l	İ
.444388:			1	<u> </u>	1	<u> </u>	1
Allendale	•	•	•	Poor	•	Poor	
	!	•	10.00	•	10.00	•	10.00
	!			-	10.00		!
	!	organic matter		•	10.71	<u> </u>	!
		Too acid	0.54	 	1	 	1
.444402:	1	İ	!	! !		l İ	1
Tonkey	-  90	Fair	i	  Poor	i	  Poor	i
	1		0.13	• • •	10.00	•	0.00
	i	organic matter					
	1	- 	I	I	I	I	I
.444410:	1	l	I	I	I	I	1
Tula	-  80	Fair	1	Poor	1	Poor	1
	1	Low content of	0.13	Wetness	10.00	Wetness	10.00
	1	organic matter	1	I	1	Rock fragments	0.47
	1	Too acid	0.54	I	1	Hard to reclaim	10.88
	1	Droughty	10.86	!	1	(rock fragments)	1
444414.	1		!		!	<u> </u>	!
444414: Lupton	I - I 40	l Good	!	  Poor		  Poor	!
парсоп	1 -20	1	:	•	10.00	•	10.00
			:	•	•	Organic matter	10.00
	i		i	l Duscy	10.00	content high	10.00
	i		i	i	i		i
Cathro	-   30	  Fair	İ	Poor	İ	Poor	İ
	1	Too acid	0.99	Wetness	10.00	Wetness	10.00
	1	l	1	Dusty	0.80	Organic matter	10.00
	1	l	I	I	I	content high	I
	1	l	I	I	I	I	I
Tawas	-  25	Good	1	Poor	•	Poor	
	!		!	•	10.00	•	10.00
	!		!	Dusty	10.80		10.00
	1	1	!	! !	1	content high	!
.444425:	1	İ	!	! !		l İ	!
Lerch	-I 50	lPoor	i	Poor	i	  Poor	i
101011	1				0.00		0.00
	i				0.00		0.00
	i	organic matter		_	10.00		1
	i		0.84		İ	i	i
	i			İ	i	i İ	i
Herbster	-  35	Poor	I	Poor	I	Poor	1
		Too clayey	10.00	Wetness	0.00	Wetness	10.00
	1	Low content of	0.13	Shrink-swell	0.22	Too clayey	10.00
	1	organic matter		· <u>-</u>	0.82	I	1
	1	Too acid	0.84	!	!	<u> </u>	!
111126.	1		I	 	1	] !	I
444426: Portwing	1 -1 50	l Poor	1	  Poor		  Poor	1
	1				10.00		0.00
	i		10.00		10.34		10.00
	i				10.82		1
	í	organic matter	1		<del></del>	I	i
		Organize maccer					

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

	Pct.   of	•	rial	Roadfill source		Topsoil sourc	e e
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444426: Herbster	   30       	Too clayey Low content of organic matter	0.00  0.13	Shrink-swell   Dusty	      0.00  0.22  0.82	Too clayey	      0.00  0.00
1444427: Cornucopia	   80   81   1	Too clayey   Low content of   organic matter	0.00  0.50	Dusty 	      0.57  0.94 	·	    0.00  0.63 
1444428: Cornucopia	   80       	Too clayey	0.00  0.50	Shrink-swell   Dusty	    0.00  0.57  0.94	Too clayey	    0.00  0.00
1444431: Croswell	   82         	Too sandy Wind erosion	    0.00  0.00  0.13	İ	    0.53     	  Poor   Too sandy   Wetness   	    0.00  0.53 
1444432: Gogebic	   85     		    0.12  0.13 	•	    0.00   	  Poor   Wetness   Too acid 	    0.00  0.87 
1444435: Iosco	   85       	Wind erosion   Low content of   organic matter	0.00  0.13	i I	    0.00   	  Poor   Wetness   Too sandy   Rock fragments 	  0.00  0.43  0.99
1444457: Redrim	   85       	Too sandy	0.00  0.00 	-   	      0.00   	  Poor   Too sandy   Depth to bedrock   Rock fragments 	    0.00  0.00  0.00
1444459: Zeba	   90         	  -  Poor   Wind erosion   Low content of   organic matter   Too acid 	    0.00  0.13    0.68	Depth to bedrock	      0.00  0.00   		    0.00  0.79  0.97
1444460: Abbaye	   55         		0.00    0.50	Wetness	    0.00  0.14   		  0.14  0.58  0.85

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct.   of	•	rial	   Roadfill sourc 	e	      Topsoil sourc 	:e
	_	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444460:	 	 	 	 	 	 	1
Lapoin	-  40	Poor	1	Poor	1	Fair	1
	1	Low content of	10.00	Depth to bedrock	0.00	Wetness	0.14
	1	organic matter	1	•	0.14		0.22
	1		0.31		10.36	Depth to bedrock	10.99
	1	Too acid	10.50	I	I	I	1
	!	<u> </u>	!	!	!	<u> </u>	!
1444461: Abbaye	1 55	l Doom		l Doom	!	  Fair	!
Abbaye	.1 22		10.00	Poor   Depth to bedrock	•	•	10.14
	<u> </u>	organic matter	•	•	0.14		•
	i	Too acid	0.50	•	1	Too sandy	10.85
	i	Depth to bedrock			i	l 100 banay	1
	i	l	1	i	i	i	i
Zeba	-  40	Poor	i	Poor	i	Poor	i
	1	Wind erosion	0.00	Wetness	0.00	Wetness	10.00
	1	Low content of	0.13	Depth to bedrock	10.00	Depth to bedrock	10.79
	1	organic matter	1	I	I	Rock fragments	0.97
	I	Too acid	10.68	I	1	I	1
	1	!	!	!	!	<u> </u>	!
1444477:	1 25	   Barana	!	 	!	   Barana	!
Cublake	-  35	•	•	Fair   Wetness	•	Poor	10.00
	!		10.00		10.53	Too sandy   Wetness	0.00  0.53
	1	Wind erosion   Too acid	10.00		!	wethess   Too acid	10.33
	;	l 100 acid	•	! 		l 100 acid	10.00
Croswell	-1 20	  Poor	•	'  Fair	i	  Poor	i
	i		•	•	0.53	•	0.00
	i	· <u>=</u>	0.00		İ	Wetness	0.53
	i	Low content of	0.13	İ	i	Rock fragments	0.97
	1	organic matter	I	I	I	l	1
	1	I	1	I	I	I	I
Ashwabay	20		•	Fair	•	Poor	
	!	Too sandy	•		10.89	· <u>-</u>	10.00
	1	Wind erosion   Too acid	•	•	0.99	Wetness	10.89
	1	i 100 acid	10.46	! !	!	] 	!
1444478:	i .	! 	<u> </u>	! !	<u> </u>	! 	i .
Cublake	- i 35	Poor	i	'  Fair	i	'  Poor	i
	i	•	•	•	0.53	•	0.00
	İ	Wind erosion	0.00	İ	İ	Wetness	10.53
	1	Too acid	0.21	I	I	Slope	10.63
	1	I	1	I	I	I	1
Croswell	-  20					Poor	1
	1	Too sandy			10.53	· •	10.00
	!	Wind erosion	10.00		!	Wetness	10.53
	!	Low content of	0.13	!	!	Slope	10.96
	!	organic matter		! !	!	] 	!
Ashwabay	1 20	l Poor	1	  Fair	1	  Poor	1
Ashwabay	, 20 I	Too sandy	10.00		10.53	•	10.00
	i	Wind erosion	10.00	•	10.99	· -	10.53
	i	Too acid	0.46	•		Slope	10.63
	1	I	I	I	I	_ 	I
1444479:	1	I	I	I	I	I	I
Morganlake	·  85			Fair	I	Fair	1
	I	Wind erosion	10.00		0.14		0.14
	1	Low content of	0.13	Shrink-swell	0.99	Too acid	0.96
	!					100 4014	10.00
	!	organic matter Too acid	    0.16	I			

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

and soil name		reclamation mate		İ	Roadfill source		e
		Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444480: Morganlake	   85       	Wind erosion   Low content of   organic matter	0.00  0.13	Shrink-swell	      0.14  0.99 	•	    0.14  0.63  0.96
1444481:	į			  -	į	  -	į
Kellogg		Wind erosion   Too acid	0.00  0.12  0.13	Wetness	  0.00  0.14  0.64	i	  0.14   
Allendale	•	Wind erosion   Low content of   organic matter	0.00  0.13	Low strength Shrink-swell	•		  0.00   
Ashwabay		Too sandy Wind erosion	0.00	Shrink-swell	    0.89  0.99 	· -	  0.00  0.89 
1444482: Kellogg		Wind erosion   Too acid   Low content of	0.00  0.12	Wetness	•	-	    0.14  0.63 
Allendale	•	Wind erosion   Low content of   organic matter	0.00  0.13	Low strength Shrink-swell	    0.00  0.00  0.71	Slope	    0.00  0.96 
Ashwabay	   20     	Too sandy Wind erosion	0.00	Shrink-swell	0.89 0.99	· •	  0.00  0.63  0.89
1444486: Sedgwick	   50       	Low content of organic matter Too acid	  0.13 	Low strength Shrink-swell		Too clayey	    0.00  0.50 
Munuscong	   30       		0.13 	Low strength	    0.00  0.00  0.77	l	    0.00   
1444487: Superior	   50         	Too clayey   Low content of   organic matter	0.01	Low strength Shrink-swell	    0.00  0.00  0.23	Too clayey	    0.00  0.01 

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

	Pct.	reclamation mate		   Roadfill source 		   Topsoil sourc 	
	_	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
1444487: Sedgwick	   30       	Low content of organic matter Too acid	0.13	Low strength Shrink-swell	      0.00  0.00  0.29	Too clayey	      0.00  0.56 
1444400.	!		1		!		!
1444488: Superior	   50       		0.01  0.13	Low strength Shrink-swell	    0.00  0.00  0.23	Too clayey	  0.00  0.01  0.63
Sedgwick		Low content of   organic matter   Too acid	0.13 	Low strength Shrink-swell	  0.00  0.00  0.29	Too clayey	  0.00  0.56 
1444489: Sultz	   35       	Too sandy Wind erosion Low content of	0.00  0.00  0.13	İ	      0.00     	  Poor   Slope   Too sandy   Rock fragments 	    0.00  0.00  0.97
Ashwabay	25     	Too sandy Wind erosion	10.00	Wetness	    0.08  0.89  0.99	Too sandy	  0.00  0.00  0.89
Rubicon	   20     	Too sandy		İ	    0.00   	  Poor   Slope   Too sandy   Too acid 	  0.00  0.00  0.99
1444492: Manistee	   40     	  Poor   Wind erosion   Low content of   organic matter   Too acid	0.00  0.13    0.89	Slope   Shrink-swell	0.00  0.00  0.77	-    -  -	    0.00   
Kellogg	   30       	  Poor   Wind erosion   Too acid   Low content of   organic matter		Wetness		Wetness	  0.00  0.14 
Ashwabay	20       	   Too sandy   Wind erosion   Too acid	  0.00  0.00  0.46	Wetness	  0.00  0.89  0.99	Too sandy	  0.00  0.00  0.89
1444506:	I	I	1	I	I	I	1
Keweenaw	60         	Poor   Wind erosion   Too sandy   Low content of   organic matter 	  0.00  0.00  0.13 	ĺ	         	Poor   Too sandy   Rock fragments     	  0.00  0.82   

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	Pct.		rial	Roadfill sourc 	е	Topsoil sourc 	e
	map  unit	Rating class and   limiting features		Rating class and   limiting features		Rating class and limiting features	Value
1444506:		<u> </u>		 	 	 	1
Rubicon	1 30	Poor	i	  Good	i	  Poor	<u> </u>
Rubicon	1	Too sandy	0.00	•	i	Too sandy	10.00
	i	Wind erosion	10.00		i	l 100 banay	1
	i	Low content of	0.13		i		i
	i	organic matter	İ	İ	i	İ	i
1444507.	1		1	<u> </u>	1	<u> </u>	1
1444507: Keweenaw	I I 60	  Poor	1	l IGood		  Poor	!
new centur	1	Wind erosion	0.00	•	i	Too sandy	0.00
	i	Too sandy	10.00	•	i	Rock fragments	10.82
	i	Low content of	0.13		i	Slope	10.84
	i	organic matter	İ	İ	i	i	i
Dulai aan		  Page	1		!	   Page	!
Rubicon	30		10.00	Good	!	Poor	10.00
	1	Too sandy   Wind erosion	10.00		!	Too sandy   Slope	10.63
		Low content of	10.13		!	ı I SIOPE	10.03
	i	organic matter	1	' 	i	' 	i
	!	!	1	!	!	<u> </u>	!
1444585: Meehan, beaches	   90	  Poor	1	  Poor		  Poor	!
Heeliaii, Deaches	1	Too sandy	10.00	•	0.00	•	10.00
	i	Wind erosion	10.00	•	1	Too sandy	10.00
	i	Low content of	0.13	•	i	Too acid	10.94
	İ	organic matter	i	İ	i	i I	i
1444586:				 	1	 	1
Wurtsmith, beaches	90	Poor	İ	  Fair	i	  Poor	i
·	İ	Too sandy	0.00	Wetness	10.53	Too sandy	10.00
	İ	Wind erosion	0.00		İ	Wetness	10.53
	1	Too acid	0.12	I	I	Too acid	10.90
1444587:				  -	1	 	!
Grayling, beaches	95	  Poor	i	।  Good	i	  Poor	i
<b>2</b> 3.	i	Too sandy	0.00	İ	i	Too sandy	0.00
	i	Wind erosion	0.00		i	Too acid	10.93
	1	Droughty	10.06	I	I	I	1
1529830:				  -	1	 	!
Meehan, beaches	90	  Poor		  Poor	i	  Poor	i
	İ	Too sandy	0.00	Wetness	0.00	Wetness	10.00
	1	Wind erosion	10.00	I	1	Too sandy	10.00
	1	Low content of	0.13	l	1	Too acid	10.94
	!	organic matter	1	!	!	<u> </u>	!
1700372:	1	 	1	] 	1	 	1
Loxley	40	  Fair	i	  Poor	i	  Poor	i
_	I	Too acid	0.50		0.00	Wetness	0.00
	1	I	1	Dusty	0.80	Organic matter	10.00
	I	I	I	I	I	content high	I
	1	<u> </u>	1	<u> </u>	!	Too acid	0.13
Beseman	I I 30	  Fair	1	  Poor		  Poor	1
	. Ju	Too acid	0.61		0.00	•	0.00
	i	Water erosion	0.90	•	0.80		10.00
	i	I	1	<u>.</u>	1	content high	1
	i	İ	i	i I	i	Too acid	0.20
	1	i .	1	I	1	I	i

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

Map unit symbol and soil name	  Pct.   of		rial	   Roadfill sourc 	e	      Topsoil sourc 	e
	_	Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features	
1700372: Dawson	   28         	•	      0.00     		      0.00  0.80   		    0.00  0.00    0.13
1700373: Rifle	   90     	  Good       	       	•	    0.00  0.80	•	10.00
1700374: Allendale	   35     	Wind erosion   Low content of   organic matter	0.00  0.13	Low strength Shrink-swell	•	•	    0.00   
Wakeley	   30     	Low content of organic matter	0.13    0.50	Low strength Shrink-swell	•		    0.00   
Kinross	   20     	Too sandy Too acid		Ì	    0.00     	  Poor   Wetness   Too sandy   Too acid 	  0.00  0.00  0.93
1702605: Menominee	   85     	Wind erosion   Low content of   organic matter	0.00  0.13	 	    0.08   	  Poor   Slope   Rock fragments   	    0.00  0.91 
1702606: Deerton	   50       	Low content of organic matter Droughty	0.00	•	•	  Poor   Too sandy   Too acid   Rock fragments 	    0.00  0.76  0.88
Brownstone	   40       	Too sandy Low content of organic matter	0.00	Stones	0.00	Rock fragments	  0.00  0.00  0.79 
1702607: Deerton	   50         	Low content of organic matter Droughty Too sandy	10.00 1 10.00 10.00		•	  Poor   Too sandy   Slope   Too acid 	    0.00  0.63  0.76

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Table 12.—Source of Reclamation Material, Roadfill, and Topsoil—Continued

	Ī	I		I		I	
	Pct.	•		Roadfill sourc	е	Topsoil sourc	e
and soil name	of	reclamation mate	rial	<u> </u>		<u> </u>	
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	1
1702607:		 		<u> </u>	1	 	1
Brownstone	1 40	  Poor		l Poor	:	l Poor	1
BIOWIIS COILE	1 -20	Too sandy	10.00		•	,	10.00
	!	Low content of	10.00	•	10.13	·	10.00
	!	organic matter	10.00		10.13		10.63
	1	Droughty	10.01		10.30	, siope	10.03
	 	Droughty	10.01	 		 	
1702608:	i	i I	i	· 	i		i
Abbaye	90	Poor	I	Poor	I	Fair	1
_	1	Wind erosion	10.00	Depth to bedrock	0.00	Wetness	0.14
	İ	Low content of	0.00	Wetness	0.14	Slope	0.63
	İ	organic matter	İ		İ	Depth to bedrock	0.71
	İ	Too acid	10.50		i	i -	i
	i	i İ	i	I	i	i I	i
1711685:	i	İ	i	i I	i	i I	i
Cublake	50	Poor	1	Fair	1	Poor	1
	I	Too sandy	10.00	Wetness	0.53	Too sandy	10.00
	I	Wind erosion	10.00	1	I	Wetness	10.53
	I	Too acid	0.21	I	I	Too acid	10.88
	1	l	1	I	I	I	1
Keweenaw	30	Poor	1	Good	I	Poor	1
	I	Wind erosion	10.00	I	I	Too sandy	10.00
	I	Too sandy	0.00	I	I	Rock fragments	10.82
	I	Low content of	0.13	I	I	I	1
	I	organic matter	Ι	I	I	I	I
	1	I -	1	1	I	I	1

## Table 13.-Ponds and Embankments

(Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the limitation. See text for further explanation of ratings in this table)

and soil name	Pct.  Of	i		Embankments, dikes   levees		excavated pond	
		•	•		•	Rating class and	
	lunit	limiting features	<u>!</u>	limiting features	<u>!</u>	limiting features	<del>!</del>
433292: Lerch	   50       	· -			1.00 	excavation walls Depth to	0.54
Herbster	   35           	•	    0.72         	  Very limited   Depth to   saturated zone     	1.00 	excavation walls Depth to saturated zone	0.54
433296:	i	i	i	i	i	i	i
Cublake	35     	· -	  1.00 	Very limited   Seepage   Depth to   saturated zone	  1.00  0.99	•	  1.00 
Croswell	20       	· -	  1.00 	  Very limited   Seepage   Depth to   saturated zone			  1.00   
Ashwabay	   20     	=	    1.00   	Seepage   Depth to		· •	    1.00   
422200.	!	! !	!	  -	!	! :	!
433299: Cublake	   35     	Seepage		  Very limited   Seepage   Depth to   saturated zone	    1.00  0.99	•	    1.00   
Croswell	   20     	Seepage	11.00	  Very limited   Seepage   Depth to   saturated zone	11.00	  Very limited   Unstable   excavation walls 	    1.00   
Ashwabay	   20     	=		Seepage		•	    1.00   
433300:	I I	I I	1	 	1	 	1
Kellogg	35     	  Very limited   Seepage   Slope 	  1.00  0.08	•	11.00	  Very limited   Depth to water 	  1.00
Allendale	25       	  Very limited   Seepage   Slope 	  1.00  0.08	=	  1.00 	  Very limited   Depth to water   	    1.00   

Table 13.—Ponds and Embankments—Continued

	Pct.   of	•	reas	Embankments, dikes   levees	, and	_	is
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	<u> </u>	limiting features	1	limiting features	1
	!	!	!	!	!	<u> </u>	1
433300: Ashwabay	1 20	  Very limited	!	  Very limited	!	  Very limited	
Asiiwabay	1 20	· -		-		Depth to water	11.00
	i				10.86	·	1
	i		1	saturated zone	•	i I	i
	į .	İ	i	İ	i	İ	i
433301:	I	I	1	I	1	I	1
Kellogg						Very limited	1
	!			•	•	Depth to water	11.00
	!	Slope	1.00	saturated zone	!	 	!
Allendale	1 25	  Very limited	!	  Very limited	i	  Very limited	!
ATTENDATE				Depth to			11.00
	i			saturated zone		l	1
	i	i	i	İ	i	i İ	i
Ashwabay	20	Very limited	1	Very limited	I	Very limited	1
	I	Seepage	11.00			Depth to water	11.00
	I	Slope	1.00	-	10.86	I	1
	!	!	!	saturated zone	!	<u> </u>	1
422204	!	!	!	1	!	  -	!
433304: Sedgwick	I I 50	  Not limited	!	  Very limited	!	  Very limited	!
Sedgwick	1 30	I I I I I I I I I I I I I I I I I I I		-		Depth to water	11.00
	i	i i	i	saturated zone		l	1
	i	i	i	Hard to pack	•	i i	i
	İ	Ì	İ	Dusty	0.01	İ	Ì
	1	l	1	l	I	l	1
Munuscong	30	· -		-		Very limited	1
	!	Seepage				Depth to water	11.00
	!	!	!		11.00	•	!
	!	1	!	saturated zone   Dusty	I  0.01		!
	:	! !	<u> </u>	l Dusty	10.01	! 	<u> </u>
433305:	i	i	i	i	i	i i	i
Superior	50	Somewhat limited	Ì	Very limited	İ	Very limited	Ì
	I	Slope	10.08	Depth to	1.00	Depth to water	1.00
	I	I	1	saturated zone		•	1
	1	1	1	·	10.96		1
	!	!	!	Dusty	0.01	  -	!
Sedgwick	1 30 1	  Not limited		  Very limited	i	  Very limited	!
beagwick	1	I	i			Depth to water	11.00
	i	i i	i	saturated zone			1
	i	İ	i	Hard to pack	0.77	i I	i
	I	I	1	Dusty	0.01	I	1
		!	1	!	1	!	1
433309:	[^	 	1	 	1	 	1
Superior	1 20	· -		Very limited		Very limited	I I1 00
	1	Slope	11.00	Depth to   saturated zone	1.00 	Depth to water	11.00
	i i	! 	<u> </u>	Hard to pack	1  0.96	! 	1
	i		i	Dusty	0.01		i
	İ	· 	İ	İ	İ	I	í
Sedgwick	30	Somewhat limited	1	Very limited	I	Very limited	1
	1	Slope	0.92	•	1.00	Depth to water	1.00
	I	I	1	saturated zone	1	<u> </u>	1
	!	!	!	Hard to pack   Dusty	0.77  0.01		!

Table 13.—Ponds and Embankments—Continued

	Pct.   of	•	reas	Embankments, dikes   levees	, and	=	ls
	map	Rating class and	Value	Rating class and	Value	<del></del>	
	unit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	1
433310:			!		1	<u> </u>	!
Sultz	ı I 35	  Verv limited	i	  Very limited	i	  Very limited	i .
	i	· -		Seepage		Depth to water	11.00
	Ì	Slope	11.00	ĺ	İ	Ī	İ
A charabass	25	  Town limited	1	  Town limited		  Tom: limited	!
Ashwabay	25 	•	  1.00	Very limited   Seepage		Very limited   Depth to water	11.00
	i			Depth to	10.86	·	1
	i		i	saturated zone	I	İ	i
		l	!	l	1	l 	!
Rubicon	20	•		Very limited		Very limited	11 00
	!		11.00	Seepage	11.00	Depth to water	11.00
	i	STOPE	1	! 	i	! 	i
433314:	Ì	İ	İ	Ī	İ	l	İ
Manistee	40	· -	•	Not limited	1	Very limited	
	!		1.00		!	Depth to water	11.00
	 	Slope	1.00 	I I	1	 	!
Kellogg	30	Very limited	i	Very limited	i	Very limited	i
	I	Seepage	1.00	Depth to	1.00	Depth to water	11.00
	!	Slope	11.00	saturated zone	!	<u> </u>	!
Ashwabay	I I 20	  Verv limited	<u> </u>	  Very limited	1	  Very limited	!
	i	· -		Seepage	•	Depth to water	11.00
	i	Slope		Depth to	0.86	·	i
		!	1	saturated zone	1	<u> </u>	1
433326:	 	 	!	 	1	 	!
Rubicon	,   85	  Very limited	i	  Very limited	i	  Very limited	i
	İ	Seepage	11.00	Seepage	11.00	Depth to water	11.00
		!	1	!	1	!	1
433379: Allendale	   80	  Very limited	!	  Very limited	1	  Very limited	!
ATTENDATE	1	· -		Depth to		Depth to water	11.00
	i		i	saturated zone	i		i
400545	!	!	!	!	!	<u> </u>	!
433515: Lupton	I I 40	  Very limited	1	  Very limited	1	  Somewhat limited	!
zapcon	1	Seepage	1.00	•		Unstable	10.10
	i	l .	i	content	i	•	3
	I	I	1	Ponding	1.00	l	1
	1	ļ.	1	Depth to	11.00	ļ	1
	!	!	!	saturated zone	1 00	<u> </u>	!
		 	1	Seepage   Hard to pack	1.00  1.00		!
	i	i I	i		1	i I	i
Cathro	30	Very limited		Very limited	•	Somewhat limited	1
	Į.	Seepage	11.00	•	1.00	•	10.50
	1	 	I	Depth to   saturated zone	1.00		5   
	1	 	1	saturated zone   Seepage	  1.00	 	
	i i	! 	i	Seepage   Hard to pack	11.00		
	i	i I	i	Dusty	0.01		i
	i	: I	i	· -		i i	1

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.	•	reas	Embankments, dikes   levees	, and	_	s
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
433515: Tawas	  -  25           	    Very limited   Seepage         	    1  1.00         	  Very limited   Ponding   Depth to   saturated zone   Seepage   Hard to pack   Dusty	11.00	excavation walls       	    1.00           
433572: Portwing	    -  50 	    Somewhat limited   Seepage	      0.72	    Very limited   Depth to	      1.00	    Very limited   Unstable	      1.00
		Slope   	0.08     	saturated zone	 	saturated zone	0.54
Herbster	  -  30         	  Somewhat limited   Seepage       	  0.72       	  Very limited   Depth to   saturated zone     	  1.00       	excavation walls Depth to saturated zone	0.54
433573: Cornucopia	  -  80   	  Very limited   Slope   Seepage	    1.00  0.72	•	 	  Very limited   Depth to water 	    1.00
433582: Croswell	  -   82     	  Very limited   Seepage   	    1.00 	  Very limited   Seepage   Depth to   saturated zone	    1.00  0.99	•	    1.00 
433599: Annalake	  -  85         	  Somewhat limited   Seepage   Slope   	    0.72  0.08   		      1.00  0.86   	excavation walls Slow refill	0.28  0.06
433600: Annalake	  -  80           	  Very limited   Slope   Seepage     	    1.00  0.72     		    1.00  0.86     	excavation walls	    1.00    0.28  0.06
433671: Arnheim	   85       	  Somewhat limited   Seepage       	    0.72     	  Very limited   Ponding   Depth to   saturated zone   Piping   Dusty	   1.00  1.00   1.00   0.01	excavation walls	    1.00       

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct. of	•	reas	Embankments, dikes   levees	, and	Aquifer-fed excavated pond	s
		Rating class and   limiting features		Rating class and   limiting features		Rating class and   limiting features	
433676: Redrim	I I	  -  Very limited   Depth to bedrock	     	    Very limited   Seepage	 	 	      1.00
433679: Lapoin	   85         	•	0.72	-	1.00 	bedrock   Unstable   excavation walls	    1.00    0.50    0.28
433686: Zeba	   90           	Depth to bedrock		•	1.00 	bedrock   Unstable   excavation walls	  1.00    0.50    0.28
433729: Sultz	   85 	•	    1.00	  Very limited   Seepage	    1.00	  Very limited   Depth to water	    1.00
433739: Moquah	   85         		    0.72     	  Somewhat limited   Depth to   saturated zone   Dusty 	0.86 	excavation walls Slow refill	    1.00    0.28  0.06
433771: Beaches	     97	    Not rated 		    Not rated 		    Not rated 	     
433802: Udorthents, ravines and escarpments		      Not rated 	       	      Not rated 	       	      Not rated 	,       
452739: Water	   100	  Not rated 	 	  Not rated	 	  Not rated 	 
452765: Abbaye	   55         	Depth to bedrock		_	    1.00       	bedrock   Unstable   excavation walls	   1.00   1.050   0.50
Lapoin	   40       	  Somewhat limited   Seepage   Depth to bedrock   	0.72	•	  1.00       	bedrock   Unstable   excavation walls	  1.00    0.50    0.28

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.	•	reas	Embankments, dikes   levees	, and	Aquifer-fed excavated pond	s
	-	Rating class and		-		-	
	unit	limiting features	<del> </del>	limiting features	<del>!</del>	limiting features	<u>!</u>
1383557: Au Gres	   85     	  -  Very limited   Seepage   	    1.00	· -		  -  Very limited   Unstable   excavation walls 	      1.00 
1383580:					!		!
Loxley	40           	  Very limited   Seepage           	  1.00         	content Ponding Depth to saturated zone Seepage	1.00    1.00  1.00 	excavation walls    -  -  -  -	  0.10       
		 		Hard to pack	11.00	 	1
Beseman	30             	  Very limited   Seepage           	  1.00         	content Ponding Depth to saturated zone Seepage	1.00    1.00  1.00	 	  0.50         
Dawson	28	  Very limited   Seepage	    1.00	  Very limited   Organic matter	    1.00	  Very limited   Unstable	    1.00
	         	Scapage		content   Ponding	  1.00  1.00	excavation walls    -  -  -  -	•
1383581:	1	l	I	I	1	l	I
Rifle	90             	Very limited   Seepage             	  1.00           	content   Ponding	1.00    1.00  1.00	excavation walls    -  -  -  -	  0.10             
1383603:	i	i I	i	! 	i	' 	i
Cornucopia	80     	Slope	  1.00  0.72		     	Very limited   Depth to water   	  1.00 
1383658:	i	i İ	i	İ	i	İ	İ
Deerton	50     	Very limited   Seepage   Depth to bedrock	1.00	Very limited   Seepage   	  1.00 	Very limited   Depth to water   	  1.00 
Brownstone	40   	  Very limited   Seepage   Depth to bedrock	1.00		1.00  0.39	  Very limited   Depth to water   	1 1.00

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.  of	•	reas	Embankments, dikes   levees	, and	Aquifer-fed   excavated pond	s
	map	Rating class and	Value	Rating class and	Value		
		limiting features		limiting features		limiting features	
	1	I	I	l	I	l	I
1383660:		177	!	177	!		!
Deerton	1 50	•		Very limited		Very limited	1 00
	!		11.00		11.00	Depth to water	11.00
	!	•	11.00	•	!	!	!
	!	Depth to bedrock	10.52	1	!	1	!
Brownstone	1 40	  Very limited	i	  Very limited	<u> </u>	  Very limited	<u> </u>
Diomiscone	•	•	1.00	•	11.00	•	11.00
	i		11.00		10.39		1
	i	Depth to bedrock		•	İ	i	i
	i	i	i	İ	İ	İ	i
1383662:	I	I	I	I	I	I	I
Abbaye	90	Very limited	I	Very limited	1	Very limited	1
	1	Slope	1.00	Depth to	1.00	Depth to hard	1.00
	1	Depth to bedrock	0.81	saturated zone	1	bedrock	1
	1	Seepage	10.72	I	I		0.50
	1	I	I	I	I	excavation walls	
	!	!	!	!	!	Slow refill	10.28
1383665:	!	1	!	1	!	1	!
Allendale	I I 35	  Very limited		  Very limited	!	  Very limited	!
Allendale	1 33	·         =	•	· -	•	• •	11.00
	i	l scopage	1	saturated zone	1	l sepen co macer	1
	i	i	i	1	i	i	i
Wakeley	30	Very limited	İ	Very limited	İ	Very limited	İ
	1	Seepage	1.00	Ponding	1.00	Unstable	1.00
	1	I	I	Depth to	1.00	excavation walls	1
	1	I	I	saturated zone	1	•	1.00
	1	I	1	Hard to pack	0.40		0.24
	1	I	1	I	1	saturated zone	1
Winner	1 20	 	!	 	!	 	!
Kinross	1 20	•		Very limited		Very limited   Unstable	11.00
	!	Seepage	1.00	Ponding   Depth to	11.00	•	
	-	1		· •	•	•	10.54
	i	i	i	Seepage		saturated zone	1
	i	i	i	l seepage	1	1	i
1383960:	i	İ	i	İ	İ	İ	İ
Flink	75	Very limited	I	Very limited	I	Very limited	I
	1	Seepage	1.00	Depth to	1.00	Depth to water	1.00
	1	I	I	•	I	I	I
			!	Seepage	11.00	!	!
1444357:	!	!	!	!	!	!	!
Arnheim	   85	  Somewhat limited	!	  Very limited		  Very limited	1
Armeim	1 03		10.72	_			11.00
	i	l beepage	10.72	-	11.00		•
	i	i	i	· •	1		i
	i	i	i		11.00	•	i
	I	I	I		0.01		I
	I	I	I	I	I	I	I
1444359:	I	l	I	l	I	l	I
Beaches	97	Not rated	1	Not rated	1	Not rated	1
1444065	!	I .	!	<u> </u>	!	<u> </u>	I
1444367:	!	1	!		!		1
Udorthents, ravines		  Not mated	1	  Not rated	1	  Not rated	I
and escarpments	1 65	INOU FALEG	1	Not rated	1	INOC Faced	1
	I	I	I	I	I	I	I

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.   of	Ì		Embankments, dikes   levees	, and	Aquifer-fed excavated pond	s
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	<u> </u>	limiting features	1	limiting features	1
1444378: Wakefield	   -  85 	    Very limited   Depth to	      1.00	    Very limited   Depth to	      1.00	    Very limited   Depth to water	      1.00
	 	cemented pan   Seepage   Slope 	  0.72  0.08		  0.95   	 	 
1444379:	İ	Ì	Ì	Ì	İ	l	Ì
Wakefield	-  85         	Very limited   Depth to   cemented pan   Slope   Seepage			  1.00    0.95	i -	  1.00     
1444388:	i .	! !	i .	i I	i	! 	i
Allendale	-   80     	  Very limited   Seepage   	  1.00 	  Very limited   Depth to   saturated zone	  1.00 	  Very limited   Depth to water   	  1.00 
1444402:	i	i	i	i	i	I	i
Tonkey	-  90   	Somewhat limited   Seepage 	  0.72 	Very limited   Ponding   Depth to   saturated zone	  1.00  1.00	•	  1.00    0.28
	; 	 	i I	Dusty 	0.01	•	   
1444410:	1	<u> </u>	1	<u> </u>	1	<u> </u>	1
Tula	-  80   	Somewhat limited   Depth to   cemented pan	I  0.99 	Very limited   Depth to   saturated zone		Very limited   Unstable   excavation walls	  1.00 
	 	Seepage   	0.72     	Dusty    - 	0.01     	Depth to   saturated zone   Slow refill 	0.96    0.28 
1444414:	1	I	1	I	I	l	1
Lupton	-  40   	Very limited   Seepage 	  1.00 	Very limited   Organic matter   content   Ponding	  1.00    1.00	excavation walls	  0.10 
		 	     	Depth to   saturated zone   Seepage	1.00    1.00	 	     
	1	 		Hard to pack	11.00	 	1
Cathro	-  30 	  Very limited   Seepage	11.00	•	11.00		10.50
		 	   	Depth to   saturated zone   Seepage	1.00    1.00	l	   
		 	 	Hard to pack   Dusty	1.00  0.01		 
Tawas	  -  25     	  Very limited   Seepage   	  1.00 	Depth to saturated zone	1.00  1.00 	excavation walls	1   1.00
		 	 	Seepage   Hard to pack   Dusty	1.00  1.00  0.01	l	 

Table 13.—Ponds and Embankments—Continued

	Pct. Of		reas	Embankments, dikes   levees	, and	Aquifer-fed   excavated pond	s
		Rating class and				-	
	lunit	limiting features	<del>!</del>	limiting features	<del>!</del>	limiting features	<u>!</u>
1444425:	!	 	1	 	 	] ]	 
Lerch	,   50	  Very limited	i	Very limited	i	  Very limited	i
	i	Seepage	11.00	· -		_	11.00
	I	I	1	•	1.00	excavation walls	l
	!	!	!	•		· •	0.54
	!	] 	1	Hard to pack	0.97	saturated zone	  -
Herbster	1 35	  Somewhat limited	i	  Very limited	<u> </u>	  Very limited	<u> </u>
	i		0.72	_		•	11.00
	I	l -	I	saturated zone	I	excavation walls	I
	I	I	1	I	I	· •	0.54
	!	!	!	!	!	•	
	!	 	1		1	Slow refill	0.28
1444426:	i .	! 	i	! 	<u> </u>	 	! !
Portwing	50	Somewhat limited	i	  Very limited	i	  Very limited	i
=	I		0.72	_		_	11.00
	I	Slope	10.08	saturated zone	I	excavation walls	
	!	! :	!	!	!		0.54
	!	] 	1	1	1	saturated zone   Slow refill	  0.28
	i .	! 	i	! 	<u> </u>	l prom retiti	0.26 
Herbster	30	'  Somewhat limited	i	  Very limited	i	Very limited	i
	İ	Seepage	10.72	_	11.00	Unstable	11.00
	I	I	1	saturated zone	I	excavation walls	
	!	! :	!	!	!	· •	0.54
	!	 	!	 	!	saturated zone   Slow refill	I  0.28
	i	! 	i	! 	<u> </u>	SIOW LEITII	0.20 
1444427:	i	i İ	i	i	i	i İ	i
Cornucopia	l 80	Very limited	1	Not limited	I	Very limited	I
	1	· -	11.00		1	Depth to water	11.00
	!	Seepage	10.72		1	 	1
1444428:	i .	! 	i	! 	<u> </u>	 	! !
Cornucopia	80	Very limited	i	Not limited	i	Very limited	i
	I	Slope	1.00	I	I	Depth to water	1.00
	!	Seepage	10.72	!	!		1
1444431:	I I	 	1	 	I I	 	I I
Croswell	82	'  Very limited	i	  Very limited	i	  Very limited	i
	i	Seepage	11.00	_	•	· •	11.00
	I	I	I	Depth to	0.99	excavation walls	I
	1	!	1	saturated zone	!		1
1444432:	1	 	I	 	I I	] 	1
Gogebic	I 85	  Somewhat limited	1	  Very limited	! 	  Very limited	ı I
3		Depth to		_	1.00	_	1.00
	i	cemented pan	i	saturated zone	į	i I	i
	I	Seepage	10.72		I	I	I
	!	Slope	10.08	<u> </u>	!	1	!
1444435:	!	 	!	 	!	İ	 
Iosco	l 85	  Verv limited	i	  Very limited	<u> </u>	  Very limited	<u>'</u>
		Seepage	11.00	_	1.00	_	11.00
	I	I	I	saturated zone	I	excavation walls	I
4.4.4.55	!	! :	!	!	!	<u> </u>	Į.
1444457:	   0E	  Nonce limited	I	 	I	  Tong limited	I
Redrim	l 92	Very limited   Depth to bedrock		Very limited   Seepage	  1.00	Very limited   Depth to water	  1.00
	i	_	10.54		, <u>.</u>	pebou co marer	, <u>.</u>
				•		•	•

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.		reas	Embankments, dikes   levees	, and	.   Aquifer-fed   excavated pond	ls
	map	· — — — — — — — — — — — — — — — — — — —	Value	Rating class and	Value	<del></del>	
	unit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	1
1444459: Zeba	  -  90         	  Somewhat limited   Depth to bedrock   Seepage   		•	    1.00       	  Very limited   Depth to hard   bedrock   Unstable   excavation walls   Slow refill	    1.00    0.50
1444460:	1	 	1	 			1
Abbaye	-1 55	  Somewhat limited	i	  Very limited	<u> </u>	  Very limited	i
.maa.te		Depth to bedrock		Depth to	1.00     		1.00    0.50 
Lapoin	 -  40	  Comewhat limited	1	  Very limited		  Very limited	1
паротп	40	Seepage   Depth to bedrock	10.72	Depth to	  1.00 		11.00
		 	 	 	 	Unstable   excavation walls   Slow refill	0.50    0.28
1444461:		1	1	 			1
Abbaye	  -  55   	Somewhat limited   Depth to bedrock   Seepage		•	11.00	  Very limited   Depth to hard   bedrock   Unstable	  1.00    0.50
	į	 	<u> </u>	 	<u> </u> 	excavation walls   Slow refill	•
Zeba	  -  40         	Somewhat limited   Depth to bedrock   Seepage 		_	  1.00     	  Very limited   Depth to hard   bedrock   Unstable   excavation walls   Slow refill	  1.00    0.50
	i	İ	i	İ	i	İ	i
1444477: Cublake	 -  35     	  Very limited   Seepage   	    1.00   	  Very limited   Seepage   Depth to   saturated zone	1.00  0.99	Ī	    1.00 
Croswell	  -  20     	  Very limited   Seepage   	1 1.00	  Very limited   Seepage   Depth to   saturated zone	  1.00  0.99		1.00
Ashwabay	  -  20       	  Very limited   Seepage   	  1.00   	  Very limited   Seepage   Depth to   saturated zone	  1.00  0.86	·         =	  1.00   
1444478: Cublake	  -   35     	 	    1.00  1.00		    1.00  0.99	·         =	      1.00 

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.	•	reas	Embankments, dikes   levees	, and	_	s
	-	· -				Rating class and	
	lunit	limiting features	<del> </del>	limiting features	<del>                                     </del>	limiting features	<u> </u>
1444478:	¦		<u> </u>	! 	<u> </u>	 	<u> </u>
Croswell	20	Very limited	i	Very limited	i	Very limited	i
	İ	Seepage	11.00	Seepage		=	11.00
	1	Slope	1.00	Depth to	0.99	excavation walls	I
	I	l	I	saturated zone	1	I	I
3 abasahasa	1		!		!	  Very limited	!
Ashwabay		·		Very limited   Seepage	•		11.00
	i				10.99		1
	i	<u> </u>	i	saturated zone	•	i İ	i
	1	l	1	I	1	l	I
1444479:			1	<u> </u>	1	<u> </u>	1
Morganlake	85	·		Very limited		Very limited	
	!	Seepage	11.00	Depth to   saturated zone	11.00	Depth to water	1.00
		 	1	Saturated zone	1	I I	1
1444480:	i	' 	i	I	i	i I	i
Morganlake	85	  Very limited	İ	Very limited	İ	Very limited	ĺ
	1	Seepage	1.00	Depth to	1.00	Depth to water	11.00
	I	Slope	1.00	saturated zone	1	I	I
1444401.	!		!		!		!
1444481: Kellogg	l . 1 35	  Very limited	!	  Very limited		  Very limited	!
Kellogg	1 33					<del>-</del>	11.00
	i		•	saturated zone		l Septim to water	1
	i	i -	i	İ	i	i I	i
Allendale	25	Very limited	I	Very limited	1	Very limited	I
	I			-		Depth to water	1.00
	!	· •	•	saturated zone	!	1	!
Ashwabay	1 20		1	  Very limited	1	  Very limited	!
Ashwabay		·				<del>-</del>	11.00
	i				0.86	•	i
	I	·	I	saturated zone	1	I	I
	1		1	<u> </u>	1		1
1444482:	1 40	  Town limited	!	  Town limited	1	  Town limited	!
Kellogg	1 40	·		Very limited   Depth to		Very limited   Depth to water	11.00
	i		11.00	•	1	l pebcu co macei	1
	i	- 	İ	İ	i	i İ	i
Allendale	25	Very limited	I	Very limited	1	Very limited	I
	I	Seepage	1.00	Depth to		Depth to water	1.00
	!	Slope	11.00	saturated zone	!	<u> </u>	!
Ashwabay	1 20	  Very limited	!	  Very limited		  Very limited	!
ASIIWADAY	1 20	_	11.00	•		•	11.00
	i		11.00		0.86	<del>-</del>	1
	İ	- 	İ	saturated zone	İ	l	Ì
	1	1	I	l	1	I	I
1444486:		l	!	<u> </u>	!	l	!
Sedgwick	1 20	NOT limited	!	Very limited   Depth to		Very limited   Depth to water	1 1.00
	<u> </u>	<u> </u> 	i	saturated zone	1	Depth to water	11.00
	i	' 	i	Hard to pack	0.77	i I	i
	I	l	I	Dusty	0.01		I
	1	I	I	l	1	l	I
Munuscong	1 30	-		Very limited		Very limited	
	1	Seepage	1.00	•		•	1.00
		I 		Depth to   saturated zone	1.00 		1
	i	, 	i	Dusty	0.01		i

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	  Pct.   of	•	reas	Embankments, dikes   levees	, and	_	is
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
·	lunit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	<u>.l</u>
1444487:	!	 	1		1	 	1
Superior	I I 50	  Somewhat limited	i	  Very limited	1	  Very limited	1
Superior	1			· -		Depth to water	11.00
	i		1	saturated zone		 	1
	I	I	1	Hard to pack	0.96	I	1
	I	I	1	Dusty	0.01	I	1
		l	!	1	!		1
Sedgwick	1 30	NOT limited			•	Very limited   Depth to water	1
	:	! !	<u> </u>	saturated zone	•	Depth to water	1
	i	i i	i	Hard to pack		i İ	i
	i	i İ	i	· •	0.01		i
	I	I	1	Ī	I	I	1
1444488:	1	I	1	I	I	I	1
Superior		-		· -		Very limited	
	!	Slope	11.00	Depth to   saturated zone		Depth to water	1.00
	:	! !	<u> </u>	•	10.96	•	<u> </u>
	i	i i	i	· •	0.01		i
	i	i İ	i	i	İ	i İ	i
Sedgwick	30			· _		Very limited	1
	1	Slope	0.92			Depth to water	11.00
	!	<u> </u>	!	saturated zone			!
	!	 	1	•	0.77  0.01	•	1
	i .	! 	<u> </u>	Dusty 	10.01 I	! 	<u> </u>
1444489:	i	i İ	i	i	i	İ	i
Sultz	35	Very limited	1	Very limited	I	Very limited	1
	1		11.00	• • •	11.00	Depth to water	11.00
	!	Slope	1.00	  -	!	 	1
Ashwabay	1 25	l  Verv limited	1	  Very limited	l I	  Very limited	1
		•		_		Depth to water	1.00
	İ	Slope	11.00	Depth to	0.86	Ī	i
	I	l	1	saturated zone	I	l	1
B. 1.1	1		!	177	!		1
Rubicon		-		•	•	Very limited   Depth to water	  1.00
	:		11.00		11.00	Depth to water	1
	i	510pc	1		i	! 	i
1444492:	İ	İ	İ	İ	ĺ	I	İ
Manistee	40	_		Not limited	I	Very limited	1
	!	Seepage	1.00	•	!	Depth to water	11.00
	!	Slope	1.00		1	 	1
Kellogg	1 30	l  Verv limited	i	  Very limited	1	  Very limited	1
nerrogg	1	_		_	1.00	·	11.00
	i		11.00	•	į	İ	i
	I	l	1	l	I	l	1
Ashwabay	20	_		Very limited		Very limited	
	!		1.00		1.00  0.86	-	1.00
	!	Slope	11.00	Depth to   saturated zone	10.86	l I	1
	i		i		i		i
1444506:	İ	İ	İ	İ	İ	i İ	İ
Keweenaw	60	_		Somewhat limited		Very limited	1
	!	Seepage	1.00		10.97	Depth to water	11.00
	1	Slope	10.08	 	I	  -	1
Rubicon	1 30	  Verv limited	1	  Very limited	 	  Very limited	1
	. 50	-		=		_	
	1	Seepage	1.00	Seepage	1.00	Depth to water	11.00

Table 13.—Ponds and Embankments—Continued

	Pct.   of		reas	Embankments, dikes   levees	, and	Aquifer-fed excavated pond	s
	map	Rating class and	Value	•		-	Value
	lunit	limiting features	<u> </u>	limiting features	<u> </u>	limiting features	<u> </u>
1444507	!	<u> </u>	!	!	!	!	!
1444507: Keweenaw	I I 60	  Very limited	1	  Somewhat limited		  Very limited	!
neweenaw	1 00	Seepage	11.00		10.97	•	11.00
	i	Slope	11.00		1	l	1
	i	i -	i	İ	i	İ	İ
Rubicon	30	Very limited	1	Very limited	1	Very limited	I
	1	Seepage	1.00		11.00	Depth to water	11.00
	!	Slope	1.00			  -	!
1444585:	!	 	1	 	1	 	!
Meehan, beaches	90	  Very limited	i	  Very limited	i	  Very limited	i
,	i	Seepage	11.00	<del>-</del>	11.00	_	11.00
	I	l	1	saturated zone	1	excavation walls	I
	1	<u> </u>	1	Seepage	11.00	Į.	1
1444506.	!		!		!	1	!
1444586: Wurtsmith, beaches	I 90	  Very limited	1	  Very limited	1	  Very limited	
war camerain, beaches	1 30	Seepage	11.00		•	•	11.00
	i		1	Depth to	0.99	•	•
	I	I	1	saturated zone	1	I	I
	I	l	1	l	1	I	I
1444587:			!		!	l	!
Grayling, beaches	95	• •		Very limited		Very limited	11.00
	!	Seepage   Slope	1.00  0.92		11.00	Depth to water	11.00
	i	510pc	1	! 	i	! 	i
1529830:	İ	İ	İ	İ	İ	Ì	Ì
Meehan, beaches	90	=		Very limited		Very limited	1
	!	Seepage	11.00	•	1.00	•	11.00
	!	 	1	saturated zone   Seepage	  1.00	excavation walls	1
	:	! 	<u> </u>	seepage 	11.00	! !	;
1700372:	i	I	i	İ	i	İ	i
Loxley	40	Very limited	1	Very limited	1	Somewhat limited	I
	1	Seepage	11.00		11.00	•	10.10
	!		!	content	11 00	excavation walls	!
	!	l I	1	Ponding   Depth to	1.00  1.00		!
	i	! 	i	saturated zone	1	i I	i
	i	i İ	i	Seepage	11.00	i	i
	I	l	1	Hard to pack	1.00	I	I
_	1		!	l 	!		!
Beseman	1 30	Very limited   Seepage	  1.00	Very limited   Organic matter	•	Somewhat limited   Unstable	I  0.50
	i	Seepage 	1	content	1		
	i	i I	i	Ponding	11.00	•	i
	İ	İ	İ	Depth to	11.00	Ì	Ì
	I	I	1	saturated zone	1		I
	!	!	!	Seepage	1.00		!
	I I	 	I	Hard to pack	11.00	] 	1
Dawson	1 28	  Very limited	i	  Very limited	i	  Very limited	i
		Seepage	11.00		1.00	<del>-</del>	11.00
	I	l -	I	content		excavation walls	I
	I	l	I	Ponding	11.00		I
	!	<u> </u>	!	Depth to	11.00		!
	1	 	I	saturated zone	11 00		I
	1	 		Seepage   Hard to pack	1.00  1.00		1

Table 13.—Ponds and Embankments—Continued

Map unit symbol and soil name	Pct.	•	reas	Embankments, dikes   levees	, and	Aquifer-fed   excavated pond	.s
	-	Rating class and limiting features		Rating class and   limiting features		Rating class and   limiting features	
	1	 	<del>i                                     </del>	 	<del>'</del>	 	i
1700373: Rifle	   90 	•	    1.00	  Very limited   Organic matter   content	11.00	  Somewhat limited   Unstable   excavation walls	    0.10
	         	 		Ponding	1.00  1.00	 	         
1700374:	1	 		 	1	 	
Allendale		-		  Very limited   Depth to   saturated zone	11.00	  Very limited   Depth to water   	  1.00 
Wakeley	30     	· -	11.00	  Very limited   Ponding   Depth to   saturated zone	1.00  1.00	  Very limited   Unstable   excavation walls   Slow refill	  1.00    1.00
	   	 		Hard to pack	0.40 	Depth to saturated zone	0.24 
Kinross	20       	· -			1.00  1.00		0.54
1702605: Menominee	     85   	Seepage	      1.00  1.00		 	    Very limited   Depth to water 	      1.00
1702606: Deerton	   50 	•	11.00	    Very limited   Seepage 		    Very limited   Depth to water 	      1.00
Brownstone	   40   	· -	11.00				    1.00 
1702607: Deerton	   50   	Seepage	1.00  1.00	I	    1.00 	  Very limited   Depth to water   	    1.00
Brownstone	   40     	Seepage	1.00  1.00	Large stones	  1.00  0.39	•	    1.00   
1702608: Abbaye	   90     	    Very limited   Slope   Depth to bedrock   Seepage	1.00	saturated zone	      1.00	    Very limited   Depth to hard   bedrock   Unstable	    1.00    0.50
	 	 	 	 	 	excavation walls   Slow refill	  0.28

## Soil Survey of Apostle Islands National Lakeshore, Wisconsin

Table 13.—Ponds and Embankments—Continued

	ī	I		T		I	
Map unit symbol	Pct.	Pond reservoir a	areas	Embankments, dike:	s, and	Aquifer-fed	
and soil name	of	I		levees		excavated pond	ds
	map	Rating class and	Value	Rating class and	Value	Rating class and	Value
	unit	limiting features	1	limiting features	1	limiting features	1
	I	I	T	I	I	I	1
1711685:	I	I	1	I	1	I	1
Cublake	50	Very limited	1	Very limited	1	Very limited	1
	I	Seepage	1.00	Seepage	1.00	Depth to water	1.00
	I	I	1	Depth to	10.99	I	1
	I	I	1	saturated zone	1	I	1
	I	I	1	I	1	I	1
Keweenaw	30	Very limited	1	Somewhat limited	1	Very limited	1
	I	Seepage	1.00	Seepage	10.97	Depth to water	1.00
	I	Slope	10.08	I	1	I	1
	I	I	1	I	1	I	1

Table 14.—Engineering Properties

(Absence of an entry indicates that data were not estimated)

Map unit symbol	   Depth	   USDA texture	Class	ification	Frag 	ments	P	ercenta sieve	ge pass number-	-	  Liquid	   Plas-
and soil name	<u>.</u> -	1	i		>10	I 3-10	<del>i</del>	ī	ī		limit	
	i	i	Unified	AASHTO	in	in	4	10	40	200		index
	In	I	Ī		Pct	Pct	ī	ı	ı	Ī .	Pct	ı
		1	1	1			1	I	I	I		I
433292:	I	1	1	1	I	1	1	I	I	I	1	1
Lerch	0-3	Muck	PT	A-8	0	0	100	100	100	100		
	3-7	Clay	CH	A-7	0	1 0	98-100	95-100	80-100	70-95	70-105	44-70
	7-12	Clay, silty clay	CH	A-7	0	1 0	98-100	95-100	80-100	70-95	51-102	29-70
	12-29	Clay, silty clay	CH	A-7	0	1 0	98-100	95-100	80-100	70-95	51-101	29-70
	29-56	Clay, silty clay	CH	A-7	0	0	98-100	95-100	80-100	70-95	51-101	29-70
	56-80	Stratified silt loam to	SC-SM, SM,	A-4, A-2-4,	0	0	98-100	95-100	65-100	35-90	16-36	2-17
	1	very fine sandy loam	CL, ML	A-6	l	1	1	1	1	1	1	1
	I	to loamy fine sand	1	1	l	1	1	I	I	1	1	I
	1	1	1	1		1	1	1	1	Ι	1	1
Herbster		Silt loam	CL-ML, CL	A-7, A-6, A-4			90-100					
	5-10	Silt loam, clay, loam,	CH, CL	A-7, A-6, A-4	0	1 0	90-100	185-100	75-100	55-95	26-52	9-32
	!	silty clay loam, clay	1	!	ļ	!		!	!	!	!	
		loam, silty clay				1		105 100	100 100		104 65	1
	10-13	Silty clay loam, clay,	CH, CL	A-7, A-6	I 0	1 0	190-100	185-100	180-100	165-95	34-65	117-43
	1 10 00	silty clay, clay loam		 		1	1	105 400	100 100		140.65	104 40
	13-28	· -	CH, CL	A-7	1 0		90-100					
	28-33	Stratified silty clay	CH, CL	A-7	I 0	1 0	90-100	182-100	180-100	1/0-95	145-69	25-44
	1	loam to clay to silty			!	!		1	1	!	!	!
	1 22 55	clay	I OTT OT	I IA-7	I I 0	1 0	  90-100	105 100	100 100	170 05	145 60	105 44
	1 33-33	Stratified silty clay	CH, CL	A- /		1 0	190-100	182-100	180-100	1/0-95	145-69	25-44
	1	loam to clay to silty   clay	1	l i	! !	!	1	1	1	!	1	
	I I 55-80	Stratified very fine	ML, SC-SM,	  A-6, A-4	I I 0	1 0	100-100	I 185-100	1 160-95	I 135-75	  16-32	I I 2-13
	1 33 00	sandy loam to silt	SC, SM	I 0, A 4		1	1 20 100	102 100	100 33	133 73	1 52	1 2 13
	! !	loam to loamy very	5C, 5H	 	! !	;	<u> </u>	! !	<u>'</u>		<u> </u>	<u> </u>
	i	fine sand	i	i	' 	i	i	i	i	i	i	<u> </u>
	i	1	i	i	i	i	i	i	i	i	i	i
433296:	i	i	i	i	i İ	i	i	i	i	i	i	i
Cublake	0-3	Sand	SP-SM, SM	A-3, A-2-4,	0	0	180-100	75-100	140-70	5-15	0-25	NP-4
	İ	İ	i	A-1-b	l	İ	İ	İ	İ	İ	İ	İ
	3-4	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-4,	0	1 0	80-100	75-100	40-80	5-45	0-24	NP-6
	I	fine sand, fine sand	1	A-1-b, A-2-4	I	1	1	I	I	I	1	1
	4-23	Sand, loamy sand, fine	SP-SM, SM	A-3, A-4,	0	0	80-100	75-100	40-80	5-45	0-29	NP-6
	I	sand, loamy fine sand	1	A-1-b, A-2-4	l	1	1	I	I	1	1	1
	23-32	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	0	1 0	80-100	75-100	40-80	5-45	0-23	NP-6
	I	sand, loamy fine sand	1	A-1-b, A-2-4		1	1	1	I	1	1	I
	32-40	Sand, fine sand	SP-SM, SM	A-3, A-2-4,	1 0	1 0	80-100	75-100	40-80	5-35	0-19	NP-2
	1	I	1	A-1-b	Ι .	1	1	1	1	1	1	1
	40-48	Stratified fine sand to	SP-SM, SM	A-3, A-2-4,	0	1 0	180-100	75-100	140-80	5-35	0-19	NP-2
	I	very fine sand	1	A-1-b		1	1	I	I	1	1	
	48-60	Stratified very fine	SC, SC-SM,	A-6, A-4	. 0	1 0	95-100	190-100	75-95	45-85	20-32	6-13
	!	sandy loam to silt loam	n  CL, CL-ML	1	!	!	1	1	!	!	!	1
	I	1	I	I	l	1	I	1	1	I	I	I

Table 14.-Engineering Properties-Continued

Map unit symbol	   Denth	USDA texture	1	Clas	ssi	fication	Frag	ments	Pe	ercenta	ge pass number-	-	  Liquid	   Dlac-
and soil name	l pebru	) OSDA CEXCUIE	!				   >10	I 3-10	<del></del>	steve :	iumber-		· -	
and soll name	l I	1	l IIni	fied		I AASHTO	/iu	3-10   in	I I 4	   10	I I 40	I I 200	limit	index
	l In		1 0111	TTEG		1 AASIIIO	l Pct	l Pct	<del>                                     </del>	1 10	1 - 20	1 200	   Pct	IIIIGEA
	! <del>!"</del>	1	!				Pet	PCt	!	!		!	PCt	!
433296:	  -	1	!			  -	l	!	1	1	I	1	1	!
Croswell	I I 0-1	  Sand	  SP-SM,	СМ		  A-1-b, A-2-4	I I 0	1 0	  80-100	I 175-100	  20_75	  10_25	I I 0-29	IND_6
CIOSWEII	l 1-7	Sand, loamy sand	. ,			A-1-D, A-2-4  A-3, A-2-4,	1 0		190-100		•		•	•
	,	I said, Isaliy said	I SE SEI,	SH,		A-1-b	1	1	1 30 100	/3 ±00	1 40 /3	1 3 30	1 0 20	I
	ı I 7–16	Sand, loamy sand	ISP-SM.	SP.		A-3, A-2-4,	i I 0	i 0	190-100	175-100	1 140-75	1 1 3-30	0-24	INP-6
	, , <u>-</u> 0	I	1	J_ /		A-1-b	ı	i	1	1	1	1	1 0 2 2	1
	I 16-39	Sand, loamy sand	ISP-SM.	SP.		A-3, A-2-4,	I 0	i o	190-100	75-100	140-75	I 3-30	i 0-23	NP-6
	, I		1	/		A-1-b	i	i	i	i	1	, I	i	1
	39-60		SP-SM,	SP,	SM	A-3, A-2-4,	I 0	i 0	90-100	75-100	40-70	3-15	0-19	NP-2
	I	i	i í	•		A-1-b	İ	i	i	i	İ	i	i	i
	l	Ì	İ			Ī	İ	ĺ	İ	İ	İ	İ	i	İ
Ashwabay	0-4	Loamy sand	SP-SM,	SM		A-2, A-1	J 0	1 0	90-100	80-100	30-75	10-35	0-14	NP-1
	4-5	Sand, fine sand, loamy	SP-SM,	SM		A-2, A-1	0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	l	sand	1			I	I	I	1	I	I	I	1	I
	5-12	Sand, loamy sand, fine	SP-SM,	SM		A-3, A-2, A-1	0	0	90-100	80-100	40-80	5-45	0-19	NP-1
	l	sand, loamy fine sand	1			1	l	1	1	I	I	1	1	I
	12-32	Sand, loamy sand, fine	SP-SM,	SM		A-3, A-2, A-1	1 0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	l	sand	1			I	I	1	1	I	I	I	1	1
		Sand, fine sand	SP-SM,			A-3, A-2, A-1	•	1 0	90-100		•		•	•
	45-62	Clay, clay loam, silty	CL, CH			A-7	1 0	1 0	90-100	80-100	70-100	55-95	45-69	25-44
	l	clay	1			<u> </u>		!		<u> </u>	<u> </u>	!		!
	62-80	Stratified clay to silt	[CL, CH			A-7	1 0	0	90-100	180-100	40-100	5-95	0-69	NP-44
	! :	to sand	!			!	!	!	!	!	!	!	!	!
422000	l		!				!	!	!	!	!	!	!	!
433299: Cublake	I I 0-3	  Sand	100 014	014		1 2 3 0 4	I I 0	1 0	1 180-100	   75 100	140 70	 	I I 0-25	   NTD 4
Cubiake	1 0-3	Sand	SP-SM,	SM		A-3, A-2-4,   A-1-b		0	180-100	1 /2-100	140-70	1 2-12	1 0-25	INP-4
	l 2_1	Sand, loamy sand, loamy	I CD_CM	СМ		A-1-5  A-3, A-4,	I I 0	1 0	1 180-100	I 175-100	140_00	I I 5-15	0-24	IND_6
		fine sand, fine sand	ISE-SM,	SM		A-1-b, A-2-4		1	100-100	/3-100	<del>1</del> 0-60	1 2-43	1 0-24	INE-0
		•	SP-SM,	SM		A-3, A-4,	i I 0	. 0	180-100	1 175-100	140-80	ı I 5-45	0-29	IND-6
	1 23	sand, loamy fine sand	1			A-1-b, A-2-4	•	i	1	1	1	1 3 13	1 0 23	1
	I 23-32	Sand, fine sand, loamy	SP-SM,	SM		A-3, A-4,	I 0	i o	180-100	75-100	40-80	I 5-45	0-23	NP-6
	, I	sand, loamy fine sand	1			A-1-b, A-2-4	•	i	i	i	, I	, I	i	1
	32-40	Sand, fine sand	SP-SM,	SM		A-3, A-2-4,	I 0	i 0	80-100	75-100	40-80	5-35	0-19	NP-2
	İ	i ·	į ′			A-1-b	i İ	İ	i	İ	İ	l	İ	İ
	40-48	Stratified fine sand to	SP-SM,	SM		A-3, A-2-4,		0	80-100	75-100	40-80	5-35	0-19	NP-2
	I	very fine sand	1			A-1-b	I	I	1	I	I	I	1	I
	48-60	Stratified very fine	SC, SC	-SM,		A-6, A-4	J 0	0	95-100	90-100	75-95	45-85	20-32	6-13
	l	sandy loam to silt loam	ı  CL, C	L-ML		I	I	1	1	I	I	I	1	1
	I	1	1			1	l	1	1	I	I	I	1	I

Table 14.—Engineering Properties—Continued

	I	1	I	Class	sif	ication	Fragi	ments	P		ge pass	-	1	1
Map unit symbol	Depth	USDA texture	I						<u> </u>	sieve	number-		Liquid	Plas-
and soil name		I					>10	3-10				I	limit	ticity
	1	1	Uni:	fied	- 1	AASHTO	in	in	4	10	40	200	1	index
	In	I					Pct	Pct				I	Pct	1
	Ι	1	1		- 1	I		1	1	1	I	I	1	1
433299:		1	1		- 1	I		1	1	1	1	I	1	1
Croswell	•	Sand	SP-SM,			A-1-b, A-2-4	0	•	•	•	30-75		•	•
	1-7	Sand, loamy sand	SP-SM,	SM, S		A-3, A-2-4,	0	0	90-100	75-100	40-75	3-30	0-26	NP-6
	1	I	1			A-1-b		1	1	1	1	I	1	1
	7-16	Sand, loamy sand	SP-SM,	SP, S		A-3, A-2-4,	0	1 0	90-100	75-100	40-75	3-30	0-24	NP-6
		!	1			A-1-b		!		<u> </u>	!	!	!	1
	16-39	Sand, loamy sand	SP-SM,	SP, S		A-3, A-2-4,	0	1 0	190-100	75-100	40-75	3-30	0-23	NP-6
						A-1-b		!						
	39-60	Sand	SP-SM,	SP, S		A-3, A-2-4,	0	1 0	190-100	175-100	140-70	3-15	0-19	NP-2
	!	!	!		!	A-1-b		!	!	!	!	!	!	!
5 - 1 1 - ·	1 0 4	17	100.01	G1.4	!		•	1	100 100	100 100	120 75	110 05	1 0 14	
Ashwabay		Loamy sand  Sand, fine sand, loamy	SP-SM,			A-2, A-1	0	•	•	•	130-75		•	•
	1 4-5	sand, fine sand, loamy	SP-SM,	SM	- 1	A-2, A-1	U	1 0	190-100	180-100	40-80	1 2-35	1 0-19	INP-T
	   5_10	• • • • • • • • • • • • • • • • • • • •	SP-SM,	CM	- !	ا  A-3, A-2, A-1	0	I I 0	100_100	100_100	  40-80	I I 5-45	I 0-19	IND_1
	1 3 12	sand, loamy fine sand	I SE SM,	SH	- 1	A J, A Z, A II		1	1 30 100	100 100	1-20 00	1 2 43	1 0 19	INE I
	I I 12-32	· -	SP-SM,	SM.	-	   A-3, A-2, A-1	0	1 0	190-100	180-100	1 140-80	I I 5-35	1 0-19	INTD-1
	1	sand	1	011	- i	3,,,		i	1	1	1	1	1 0 10	1
	1 32-45	Sand, fine sand	SP-SM,	SM	i.	A-3, A-2, A-1	0	i o	90-100	180-100	40-80	I 5-35	0-14	I NP
	•	Clay, clay loam, silty				A-7	0	•	•	•	70-100		•	•
	İ	clay	i		i	i		i	i	i	i	İ	i	i
	62-80	Stratified clay to silt	ICL, CH		i.	A-7 i	0	I 0	90-100	80-100	40-100	5-95	I 0-69	NP-44
	i	to sand	i ′		i	i		i	i	i	i	i	i	i
	İ	Ì	İ		i	Ì		İ	Ì	ĺ	İ	İ	İ	i
433300:	1	1	1		- 1	1		I	I	I	I	I	1	1
Kellogg	0-2	Moderately decomposed	PT		- 1	A-8	0	0	100	100	100	100		
	1	plant material	1		- 1	1		I	1	1		I	1	1
	2-6	Sand	SP-SM,	SM	- 1	A-3, A-2-4,	0	0-5	90-100	85-100	40-70	5-15	0-22	NP-4
	I	1	1		- 1	A-1-b		1			1	1	1	1
	6-26	Sand, loamy sand	SM, SP	-SM	- 1	A-3, A-2-4,	0	0-5	90-100	85-100	40-75	5-30	0-26	NP-7
	1	1	1			A-1-b		1	1	1	1	I	1	1
	26-29	Silty clay, clay, silty	CL, CH		- 1	A-7	0	1 0	95-100	95-100	90-100	70-95	41-69	21-44
		clay loam			-	_		1	1	1		I	1	1
	29-40	Silty clay, clay, silty	[CL, CH		- 1	A-7	0	1 0	195-100	95-100	90-100	70-95	45-69	25-44
		clay loam	1		-	!		1		I		I		
	40-80	Silty clay, clay, silty	ICL, CH		- !	A-7	0	1 0	195-100	95-100	190-100	170-95	41-69	21-44
	1	clay loam	1		!			1	!	!	!	!	!	1
	I	1	I		- 1			I	I	I	I	I	I	I

Table 14.-Engineering Properties-Continued

	!	1	Class	sification	Frag	ments	P	ercenta		-	1	1
Map unit symbol	Depth	USDA texture	!		<u> </u>		<del>!</del>	sieve	number-	<del>-</del>	Liquid	
and soil name	!		17-161-4	1 3301100	>10	3-10	•	1 10	1 40	1 200		ticity
	<u>!                                      </u>	<u>!</u>	Unified	AASHTO	in	in	1 4	1 10	1 40	200	<del></del>	lindex
	I In	!	1	!	Pct	Pct	1		1		Pct	1
400000	!	!	!	!	!	!	!	!	!	!	!	!
433300:		1	1		l .	1		100 100	1 65 00	105 40		
Allendale		Loamy fine sand	SM	A-4, A-2-4	1 0						0-31	
	1 3-10	Sand, loamy sand, loamy		A-3, A-4,	0	1 0	195-100	190-100	45-85	5-40	0-28	IND-IO
	!	fine sand, sandy loam,   fine sandy loam		A-1-b, A-2-4	!	!	!	!	1	!	!	!
	   10_12	Sand, fine sand, loamy	  SP-SM, SM	  A-3, A-4,	I I 0	1 0	1 195-100	100_100	1 145-00	I 5-40	I 0-23	IND_6
	1 10-13	fine sand, loamy sand	ISP-SM, SM	A-1-b, A-2-4	•	1 0	192-100	190-100	145-60	1 3-40	1 0-23	INP-6
	I I 13-26	· -	SP-SM, SM	A-1-D, A-2-4  A-2-4,	I 0	1 0	195_100	190-100	1 145-80	1 5-40	1 0-23	IND-6
	13 20 	fine sand, loamy sand	I SE SM, SM	A-1-b, A-4,		1	195 100	1 30 100	1-20 00	1 2 40	1 0 23	I
	! 	I	i	A-3	! !	i	i	<u> </u>	i	<u> </u>	i	i
	26-28	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	, I 0	i 0	195-100	190-100	145-80	1 5-40	0-23	INP-6
	, _0 _0 I	fine sand, loamy sand	1	A-1-b, A-2-4	•		1	1	1	1	1	1
	I 28-34	Clay, silty clay	існ	A-7	i 0	i 0	I 100	198-100	90-100	175-95	49-69	129-44
		Clay, silty clay	CH	A-7	I 0	i 0	•	•	•	•	149-69	•
	İ	i	i	i	İ	i	i	i	i	i	i	i
Ashwabay	0-4	Loamy sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	30-75	10-35	0-14	NP-1
_	4-5	Sand, fine sand, loamy	SP-SM, SM	A-2, A-1	J 0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	I	sand	1	1	I	I	I	I	I	I	1	1
	5-12	Sand, loamy sand, fine	SP-SM, SM	A-3, A-2, A-1	0	0	90-100	80-100	40-80	5-45	0-19	NP-1
	I	sand, loamy fine sand	1	1	I	1	1		1	1	1	1
	12-32	Sand, loamy sand, fine	SP-SM, SM	A-3, A-2, A-1	J 0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	I	sand	1	I	l	1	1	1	1	1	1	1
	•	Sand, fine sand	SP-SM, SM	A-3, A-2, A-1	•	•	•				0-14	•
	45-62 	Clay, clay loam, silty   clay	CL, CH 	A-7 	0 	0 	90-100 	80-100 	70-100 	55-95 	45-69 	25-44 
	62-80	Stratified clay to silt	CL, CH	A-7	0	0	90-100	80-100	40-100	5-95	0-69	NP-44
	I	to sand	1	1	I	I	I	I	I	I	1	1
	I	1	1	1	I	1	1	1	I	I	1	1
433301:	l	I	1	1	l	1	1	1	I	I	1	1
Kellogg	0-2	Moderately decomposed	PT	A-8	1 0	0	100	100	100	100		
	l	plant material	1	I	I	1	1	1	I	1	1	1
	2-6	Sand	SP-SM, SM	A-3, A-2-4,	1 0	0-5	90-100	85-100	40-70	5-15	0-22	NP-4
	l	1	1	A-1-b	Ι .	1	1	1	1	1	1	1
	6-26	Sand, loamy sand	SM, SP-SM	A-3, A-2-4,	1 0	0-5	90-100	85-100	40-75	5-30	0-26	NP-7
				A-1-b								
	26-29	Silty clay, clay, silty	CL, CH	A-7	1 0	1 0	195-100	195-100	190-100	170-95	41-69	21-44
	1 00 40	clay loam			1	1	105 100	105 100	100 100	170 05	145 60	105.44
	29-40	Silty clay, clay, silty	ICL, CH	A-7	1 0	1 0	195-100	195-100	190-100	1/0-95	45-69	125-44
	I 40 00	clay loam	I CT CTT	12.7	1 0	1 0	I 105 100	I 105 100	I 100 100	170 05	141 60	101 44
	1 40-80	Silty clay, clay, silty	ICL, CH	A-7	0	0	192-100	1 A2-T00	1 120-T00	1/0-95	41-69	Z
1	I	clay loam	I	1	ı	1	I	I	I	1	ı	1

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	   USDA texture	Classi	fication	Frag	ments	Po	ercenta sieve	ge pass number-	-	  Liquid	   Plas-
and soil name	 	1	Unified	   AASHTO	>10   in	3-10   in	   4	   10	   40	l I 200	limit 	ticity  index
	In In	<u>.</u> 1	I	T	Pct	Pct	<del>i -</del>	i = -	1	1	Pct	1
433301:	 	1			 	1	1	 	1	1	1	1
Allendale	0-3	  Loamy fine sand	SM	A-4, A-2-4	,   0	, 0	95-100	  90-100	  65-80	  25-40	0-31	  NP-6
	3-10 	Sand, loamy sand, loamy   fine sand, sandy loam,   fine sandy loam	SP-SM, SM 	A-3, A-4,   A-1-b, A-2-4	0 	0 	95-100 	90-100 	45-85   	5-40 	0-28 	NP-10 
	10-13	-	SP-SM, SM	A-3, A-4,   A-1-b, A-2-4	0 	,   0 	95-100	90-100 	45-80 	5-40 	0-23	  NP-6 
	13-26   	· -	SP-SM, SM   	A-2-4,   A-1-b, A-4,   A-3	0	0 	95-100   	90-100   	45-80 	5-40 	0-23	NP-6 
		Sand, fine sand, loamy   fine sand, loamy sand	SP-SM, SM 	A-3, A-4,   A-1-b, A-2-4	0 	I 0	95-100 	90-100 	45-80 	5-40 	0-23 	NP-6 
I		Clay, silty clay	CH	A-7	J 0	0	•		•		49-69	
	34-60 	Clay, silty clay	CH	A-7	I 0	I 0	100 	98-100 	90-100 	75-95 	49-69 	29-44 
Ashwabay	0-4	Loamy sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	30-75	10-35	0-14	NP-1
-		_	SP-SM, SM	A-2, A-1	0 	0 	90-100 	80-100 	40-80 	5-35 	0-19 	NP-1 
I	5-12 	Sand, loamy sand, fine   sand, loamy fine sand	SP-SM, SM 	A-3, A-2, A-1 	0 	I 0	90-100 	80-100 	40-80 	5-45 	0-19 	NP-1 
		Sand, loamy sand, fine   sand	SP-SM, SM 	A-3, A-2, A-1 	I 0 I	I 0	90-100 	80-100 	40-80 	5-35 	0-19 	NP-1 
I		Sand, fine sand	SP-SM, SM	A-3, A-2, A-1		•	90-100		•		•	
	l	Clay, clay loam, silty   clay	1	A-7 	0 	Ì	90-100 	ĺ	ĺ	ĺ	İ	ĺ
	62-80   	Stratified clay to silt   to sand 	CL, CH   	A-7   	0   	0   	90-100   	80-100   	40-100   	5-95   	0-69   	NP-44   
433304:	1	 			İ	1	1	 			102 27	
Sedgwick    	5-8	Sandy loam  Loamy sand, fine sandy   loam, sandy loam,	SM, SC-SM, SC  SP-SM, SM, SC 		0   0 	•	80-100  80-100 		•		•	
	   8-16	loamy fine sand  Sandy loam, fine sandy	  SC-SM, SC	  A-4, A-2-4	l I 0	   0-3	  80-100	  75-98  -	  45-90	  20-50	21-33	   4-12
		loam  Clay, silty clay loam,	CL, CH	  A-7, A-6	I I 0	0-3	  98-100	  95-98 	  60-95	  50-85	  31-78	  12-51
		sandy loam, clay loam  Clay, clay loam, silty   clay loam, silty clay	CL, CH	  A-7 	I   0 	0-3	  98-100	  95-98 	  85-95 	1  75-85 	  41-78	  21-51 
	53-80		CL, CH	A-7 	,   0 	0-3	98-100 	  95-98 	  85-95 	  75-95   	  41-78 	  21-51 
Munuscong	0-8	  Fine sandy loam	SM, SC-SM, SC	A-4	0	, , o	95-100	90-100	65-85	35-55	20-33	2-10
		Sandy loam, fine sandy   loam		A-4, A-2 	,   0 	•	95-100 	•	•	•	•	•
	30-60 	Silty clay, silty clay   loam, clay	CL, CH 	A-7 	I 0 I	I 0	95-100 	90-100 	80-100 	70-95 	45-86 	25-59 

Table 14.-Engineering Properties-Continued

	I	1	Classi	fication	Frag	ments	Pe	ercenta		-	1	I
Map unit symbol	Depth	USDA texture	l				<u> </u>	sieve 1	number-		Liquid	
and soil name	!	!		!	>10	3-10	•		!		limit	
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	4	10	40	200		index
	In	I	1	I	Pct	Pct	I	I	I	I	Pct	I
	!	!	!	!	!	!	!	!	!	!	1	!
433305:	!	!		!	!	!			l 	l		
Superior	0-3 	Fine sandy loam	SC-SM, SM,   SC, CL-ML,	A-4, A-2 	0 	0 	85-100 	75-100 	55-85 	30-55 	20-33 	3-10 
	I	1	ML	1	1	1	1	I	I	I	1	1
	3-6 	Sandy loam, fine sandy   loam, loam	SC-SM, SM,   ML, SC,	A-4, A-2 	0 	0 	85-100 	75-100   	45-95 	25-75 	17-27 	2-8 
		local local Since and	CL-ML	1 2 4 3 0	1	1	105 100	   75 100	1 45 05	I 105 75	110.00	1 2 10
	6-14   	Sandy loam, fine sandy   loam, loam	SC, SC-SM,   CL-ML, SM,   CL	A-4, A-2 	0 	0 	85-100 	     75-100	45-95   	25-75   	119-28	     3-10
	1 1 14-19	Clay loam, sandy loam,	ICH, CL	A-7	1 0	. 0	195-100	1 190-100	, 155-100	1 125-95	145-74	125-48
	1	clay, silty clay	1	1	i	i	1	1		1	1	1
	19-26	Clay, silty clay	, I CH	IA-7	i o	i o	95-100	90-100	180-100	170-95	154-82	132-55
		Clay, silty clay	CL, CH	IA-7	i 0	i 0	195-100		•		•	•
	i	1	i ,	i	i	i	i	İ	i	i	i	i
Sedgwick	I 0-5	Loamy sand	SM, SC-SM, SC	A-4, A-2-4	i o	0-3	80-100	75-98	45-90	120-50	123-37	4-12
2		Loamy sand, fine sandy	SP-SM, SM, SC		i 0	0-3	80-100					
 	 	loam, sandy loam,   loamy fine sand	1	A-1-b	l l	 	İ I	l I	l I	l I	İ	l I
	8-16 I	Sandy loam, fine sandy	SC-SM, SC	A-4, A-2-4	i 0	0-3 	80-100 	75-98 	45-90 	20-50 	21-33 	4-12 
	16-19 	Clay, silty clay loam,   sandy loam, clay loam	CL, CH	A-7, A-6	i 0	0-3 	98-100 	95-98 	60-95 	50-85 	31-78 	  12-51 
	I 19-53	Clay, clay loam, silty	CH, CL	A-7	i 0	I 0-3	98-100	195-98	185-95	175-85	41-78	21-51
	i	clay loam, silty clay	i ,	i	i	i	i	İ	i	i	i	i
	53-80		CH, CL	A-7	i 0	0-3	98-100	95-98	85-95	75-95	41-78	21-51
	İ	loam, clay, clay loam	İ	į	į	į	İ	İ	İ	į	į	į
433309:	 	1		1	1	1		 	 	 	1	 
Superior	i 0-3	  Fine sandy loam	SC-SM, SM,	A-4, A-2	i 0	i o	185-100	175-100	155-85	130-55	120-33	3-10
Superior	03   		SC, CL-ML,					   	   	   	   	3 10
	I 3-6	Sandy loam, fine sandy	SC-SM, SM,	A-4, A-2	i o	i o	85-100	75-100	145-95	125-75	17-27	I 2-8
	 I	loam, loam	ML, SC,					   	   	   		- 0
	6-14	Sandy loam, fine sandy	SC, SC-SM,	A-4, A-2	i 0	i o	185-100	75-100	145-95	125-75	119-28	I 3-10
 		loam, loam	CL-ML, SM,					   	   	 		   
	I 14–19	Sandy loam, clay, silty	•	IA-7	1 0	. 0	195-100	90-100	155-100	125-95	145-74	125-48
	, I	clay, clay loam		1	i	i	1	, 20 <u>2</u> 00	, 55 ±50 I	1	1	1 20
	I 19-26	Clay, silty clay	I CH	A-7	1 0	i 0	95-100	90-100	180-100	170-95	154-82	132-55
		Clay, silty clay	CL, CH	A-7	1 0		195-100					
		1	,, <b></b> ,	1			1			1	1	1

Table 14.—Engineering Properties—Continued

Map unit symbol	   Depth	   USDA texture	Classi	fication	Frag	ments	P	ercenta	ge pass number-	-	  Liquid	   Plas-
and soil name	I	1		1	>10	3-10	Ī	Ī I	1	Ī	limit	ticity
	İ	Ì	Unified	AASHTO	in	in	4	1 10	40	200	İ	lindex
	In	l	I	Ī	Pct	Pct	ı	ı	ı	ı	Pct	T
433309:		1	1	l I	 	 		 	 			
Sedgwick	I 0-5	  Loamy sand	SM, SC-SM, SC	   A-4. A-2-4	i 0	I 0-3	180-100	175-98	145-90	120-50	123-37	1 4-12
500g0	•	Loamy sand, fine sandy			1 0	•	•	•	•	•	0-28	•
	 	loam, sandy loam,   loamy fine sand		A-1-b	   	 I	   	   	   	   	   	i i
	8-16 	Sandy loam, fine sandy	SC-SM, SC	A-4, A-2-4	0 	0-3 	80-100 	75-98 	45-90 	20-50 	  21-33 	4-12 
	16-19 	Clay, silty clay loam,   sandy loam, clay loam	CL, CH	A-7, A-6	0 	0-3 	98-100 	95-98 	60-95 	50-85 	31-78 	  12-51 
	19-53 	Clay, clay loam, silty   clay loam, silty clay	CH, CL	A-7	0 	0-3 	98-100 	95-98 	85-95 	75-85 	41-78 	21-51 
	53-80		CH, CL	A-7 	0 	0-3 	98-100 	95-98 	85-95 	75-95 	41-78 	21-51 
433310:		l I		 	! 	 		! 	 			
Sultz	0-2 	Highly decomposed plant   material	PT 	A-8 	I 0	I 0	100 	100 	100 	100 	 	 
	2-6	Sand, loamy sand	SP-SM, SM	A-3, A-1-b	0	0-7	80-100	75-100	40-75	5-30	0-20	NP-2
	6-18	Sand, loamy sand	SP-SM, SM	A-3, A-1-b	0	0-7	80-100	75-100	40-75	5-30	0-23	NP-3
	18-25	Sand, fine sand	SP-SM, SM	A-3, A-1-b	0	0-7	80-100	75-100	35-75	5-35	0-17	NP-1
	25-43	Sand, fine sand	SP-SM, SM	A-3, A-1-b	0	0-7	180-100	75-100	35-75	5-35	0-17	NP-1
	43-60 	Stratified sand to fine   sand to loamy sand to   very fine sandy loam	SC-SM, SM,   CL-ML, ML	A-4, A-2-4 	0 	0-7 	90-100 	75-100 	35-95 	5-65 	0-32 	NP-13 
	i	Very Time Sandy Toam		i	! 	! 	i	! 	! 	i	i	i
Ashwabay	0-4	Loamy sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	30-75	10-35	0-14	NP-1
	4-5 	Sand, fine sand, loamy   sand	SP-SM, SM	A-2, A-1 	I 0	I 0	90-100 	80-100 	40-80 	5-35 	0-19 	NP-1 
	5-12 	Sand, loamy sand, fine   sand, loamy fine sand	SP-SM, SM	A-3, A-2, A-1 	0 	0 	90-100 	80-100 	40-80 	5-45 	0-19 	NP-1 
	12-32 	Sand, loamy sand, fine   sand	SP-SM, SM	A-3, A-2, A-1 	I 0	0 	90-100 	80-100 	40-80 	5-35 	0-19 	NP-1 
	32-45	Sand, fine sand	SP-SM, SM	A-3, A-2, A-1	•	0	90-100	80-100	40-80	5-35	0-14	NP
	45-62 	Clay, clay loam, silty   clay	CL, CH 	A-7 	I 0	I 0	90-100 	80-100 	70-100 	55-95 	45-69 	25-44 
	62-80 	Stratified clay to silt   to sand	CL, CH	A-7 	0 	0 	90-100 	80-100 	40-100 	5-95 	0-69 	NP-44 
Rubicon	0-1	  Sand	SP, SP-SM, SM	   A-3, A-2, A-1	I I 0	I I 0	90-100	  80-100	  40-70	0-15	   0-22	  NP-2
	•	Sand		A-3, A-2, A-1		•	•	•	•	•	0-19	•
	6-18	Sand		A-3, A-2, A-1							0-24	
	18-36	Sand		A-3, A-2, A-1							0-24	
	36-60 	Sand	SP, SP-SM, SM	A-3, A-2, A-1 	I 0	0 	90-100 	80-100 	40-70 	0-15 	0-19 	NP-2 

Table 14.-Engineering Properties-Continued

Man unit augli-1	   Denti	HCDA touture	Class	ification	Frag	ments	l P		ge pass	_	 	   Dle:
Map unit symbol	Depth	USDA texture	!		<u> </u>		<del>-</del> !	sieve	number-	<del>-</del>	Liquid	
and soil name	!	!		!	>10	3-10	•					ticity
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	4	1 10	40	200		index
	I In	I	1	I	Pct	Pct	1	I	I	I	Pct	I
	l	1	1	I	1	1	I	1	1	1	1	I
433314:	l	1	1	I	1	1	I	1	1	1	1	I
Manistee	•	Sand	SM	A-2-4, A-1-b	0	0	95-100	90-100	45-70	5-15	0-32	NP-7
	3-11	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-2-4,	0	0	95-100	90-100	45-80	5-45	0-24	NP-7
	l	fine sand, fine sand	1	A-1-b	1	1	1	1	1	1	1	1
	11-28	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-2-4,	0	0	95-100	90-100	45-80	5-45	0-24	NP-7
	I	fine sand, fine sand	1	A-1-b		1	1		I		1	1
	28-30	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-2-4,	0	0	95-100	90-100	45-80	5-45	0-24	NP-7
	l	fine sand, fine sand	1	A-1-b	1	1	1	1	1	1	1	I
	30-38	Clay, silty clay, clay	CH, CL	A-7	0	0	95-100	90-100	80-100	65-95	45-68	25-44
	l	loam, silty clay loam	1	1	I	1	I	I	1	I	1	I
	38-60	Clay, silty clay, clay	CL, CH	A-7	0	1 0	95-100	90-100	180-100	65-95	45-68	25-44
	I	loam, silty clay loam	1	1	I	I	1	I	I	I	1	I
	l	i	İ	İ	İ	i	İ	İ	İ	İ	i	İ
Kellogg	0-2	Moderately decomposed	PT	A-8	0	0	100	100	100	100		
33	I	plant material	i	i	i	i	i	i	i	i	i	i
i İ	I 2-6	Sand	SP-SM, SM	A-3, A-2-4,	i 0	I 0-5	190-100	185-100	40-70	I 5-15	I 0-22	NP-4
	i	1	i	A-1-b	i	i	i	i	i	i	i	i
	I 6-26	Sand, loamy sand	SM, SP-SM	A-3, A-2-4,	i 0	I 0-5	190-100	185-100	40-75	I 5-30	I 0-26	INP-7
		1	1	A-1-b	i	i	i	i	1	i	i	I
	26-29	Silty clay, clay, silty	ISM. CTMT.	IA-7	i 0	i 0	196-100	196-100	150-100	140-95	119-65	I 3-40
	, I	clay loam, loamy sand		1	i	i	1	1	1	1	1	1
	' 		CL	i	i	i	i	i	i	i	i	i
	29-40	  Silty clay, clay, silty	•	IA-7	i 0	i o	95-100	195-100	190-100	170-95	145-69	125-44
	, <u>-</u> , 10	clay loam	1	1	i	i	1	1	1	1	1	1
	I 40-80	Silty clay, clay, silty	ICT. CH	  A-7	, I 0	i o	95-100	, 195–100	190-100	1 170-95	141-69	121-44
	<del>1</del> 0 00	clay loam	I CII, CII	1 .		1	1 22 100	1	1 20 100	1 70 33	1 41 05	<u></u>
	! !	I Clay Ioan	<u> </u>	i	<u> </u>	;	i	<u> </u>	;	<u> </u>	;	! !
Ashwabay	. 0-4	I Loamy sand	SP-SM, SM	  A-2, A-1	1 0	i 0	90-100	180-100	130-75	110-35	1 0-14	INTD_1
Asiiwabay		Sand, fine sand, loamy		A-2, A-1	1 0	1 0	190-100					
	1 7 3	sand	I SH SM, SM	A 2, A 1	1	1	190 100	100 100	1-20 00	1 2 22	1 0 19	INE T
	I I 5_12	Sand, loamy sand, fine	SP-SM, SM	A-3, A-2, A-1	1 0	i 0	190-100	1 100_100	140_00	I I 5-15	0-19	INTD_1
	) J-12	sand, loamy fine sand	SF-SM, SM	A-3, A-2, A-1	1 0	1 0	190-100	100-100	1-20-00	1 2-42	1 0-19	INE-T
	   10 20	·	I CD CM CM	1 2 2 2 2 1	I I 0	1 0	190-100	100 100	140 00	1 5 25	1 0 10	INTO 1
	1 12-32	Sand, loamy sand, fine	SP-SM, SM	A-3, A-2, A-1			190-100	100-100	140-00	1 2-35	0-19	IND-T
	I I 20 4E	sand	100 04 04	13 2 3 2 3 1	1 0	1 0	100 100	100 100	140.00	1 5 25	1 0 14	   NTD
		Sand, fine sand	SP-SM, SM	A-3, A-2, A-1	I 0	1 0	190-100					NP
	45-62	Clay, clay loam, silty	ICE, CH	A-7	1 0	1 0	90-100	100-100	1,0-100	122-35	145-09	123-44
	I 60 00	clay	I CT CT	1 7	1 0	1 0	100 100	100 100	140 100	I	1 0 60	1370 44
	02-80	Stratified clay to silt	ICL, CH	A-7	1 0	1 0	90-100	190-100	140-100	5-95	1 0-69	NP-44
	!	to sand	1	!	1	!	1	1	!	!	!	!
	I	I	1	I	I	1	I	I	I	I	I	I

Table 14.—Engineering Properties—Continued

Map unit symbol	   Depth	USDA texture	Classi	fication	Fragi 	ments	P		ge pass: number-	-	  Liquid	   Plas-
and soil name	] 	 	Unified	AASHTO	>10   in	3-10   in	   4	   10	   40	   200	•	ticity  index
	In	I .	<u>.</u>	!	Pct	Pct	<u> </u>	I	!	l	Pct	Ī.
433326:	] ]	 	1		 	 	 	 	l I	 		 
Rubicon	0-1	Sand	SP-SM, SM	A-3, A-2-4,   A-1	0	1 0	90-100	80-100	40-70	5-15	0-14	NP
	1-6	Sand	SP-SM, SM	A - 1   A - 3, A - 2 - 4,   A - 1	)   0	0	90-100	80-100	  40-70	   5-15	0-14	NP
	6-18	Sand	SP-SM, SM	A-1  A-3, A-2-4,   A-1	0	0	90-100	80-100	  40-70	   5-15	0-14	NP
	   18-36		SP-SM, SM	A-1  A-3, A-2-4,   A-1	)   0	0	90-100	80-100	  40-70	   5-15 	0-14	NP
	36-60 	Coarse sand, sand	SP-SM, SM 	A-3, A-2-4,   A-1	)   0 	   0 	  90-100 	  80-100 	  40-70 	   5-15 	0-14 	NP 
433379:	] ]	 	 		 	 	 	 	 	 		 
Allendale		Loamy fine sand	SM	A-4, A-2-4	0	•	•	•	•	•	0-31	•
	3-10 	Sand, loamy sand, loamy   fine sand, sandy loam,   fine sandy loam	•	A-3, A-4,   A-1-b, A-2-4	0 	0 	95-100 	90-100 	45-85 	5-40 	0-28 	NP-10 
	   10-13	· -	SP-SM, SM	  A-3, A-4,   A-1-b, A-2-4	I   0 	   0	  95-100 	  90-100 	I  45-80 	   5-40 	0-23	  NP-6 
	13-26		SP-SM, SM 	A-2-4,   A-1-b, A-4,   A-3	0	0 	95-100 	90-100 	  45-80 	   5-40 	0-23	NP-6 
	26-28	Sand, fine sand, loamy   fine sand, loamy sand	SP-SM, SM	A-3, A-4,   A-1-b, A-2-4	,   0 	,   0 	  95-100 	  90-100 	  45-80 	   5-40 	0-23 	  NP-6 
İ	28-34	Clay, silty clay	CH	A-7	0	0	100	98-100	90-100	75-95	49-69	29-44
	34-60	Clay, silty clay	CH	A-7	I 0	J 0	100	98-100	90-100	75-95 	49-69 	29-44
433515:		i	i	i	i	i	i	i	i	i	i	i
Lupton	0−65 	Muck	PT	A-8 	0 	0 	100 	100 	100 	100 		NP
Cathro	0-28	Muck	  PT	  A-8	0	, , o	100	100	100	100	i	
I	28-49 		SC, SC-SM,   CL, CL-ML	A-6, A-4 	Ι 0 Ι	0-5 	80-100 	75-100 	60-100 	35-90 	20-40 	4-20 
[	49-60 	Sandy loam, silty clay   loam, loam	SC, SC-SM,   CL, CL-ML	A-6, A-4 	0 	0-5 	80-100 	75-100 	60-100 	35-90 	20-40 	4-20 
Tawas	   0-31	  Muck	  PT	  A-8	I I 0	I I 0	1 100	1 100	   100	   100		
İ	31-60   	Fine sand, loamy fine   sand, coarse sand,   gravelly sand, loamy   sand, sand	SC-SM,   SP-SM, SM	A-2-4 	0   0 	0   	100   	75-100   	65-90   	10-30   	0-23	NP-6   

Table 14.—Engineering Properties—Continued

Map unit symbol	   Depth	USDA texture	Class	ification	Frag	ments	Po		ge pass	-	  Liquid	   Plas-
and soil name	, Dopon	I CODII CONCUE	i	<u> </u>	   >10	I 3-10	<del></del>	1	1	1		ticity
and soll name	! !		Unified	AASHTO	/10   in	J-10	4	1 10	I 40	1 200		lindex
	l In	<del>-i</del>	1	<u> </u>	l Pct	Pct	<del></del>	<u>'</u>	<del>                                     </del>	1	Pct	1
	¦ ===	i	i	İ	1	1	<u>'</u>	' 	' 	' 	===	' 
433572:	i	i	i	i		i	i	! !	i	<u> </u>	i	<u> </u>
Portwing	I 0-4	  Silt loam	CL-ML, CL	A-6, A-4	i 0	0-4	190-100	185-100	180-100	165-90	122-41	6-18
	•	Silt loam, clay, silty		A-7, A-6, A-4		i 0	190-100	•	•	•	•	
	i	clay loam, silty clay	i	i , i,	i	i	i	İ	İ	İ	i	i
	9-32	Clay, clay loam, silty	CL, CH	A-7	0	1 0	190-100	85-100	80-100	65-95	42-65	24-43
	1	clay loam	1	1	I	1	1	I	I	I	1	I
	32-51	Clay, clay loam, silty	CL, CH	A-7	0	1 0	90-100	85-100	80-100	65-95	42-65	24-43
	1	clay loam	1	1	I	1	1	I	1	l	1	1
	51-80	Stratified very fine	SC-SM, SM,	A-4, A-2-4	1 0	1 0	90-100	85-100	65-95	30-80	16-27	2-10
	1	sand to silt	CL-ML, ML	I	I	1	1	I	1	1	1	1
	1	I	1	1	Ι .	1	1	I	1	1	1	1
Herbster	•	Silt loam	CL-ML, CL	A-7, A-6, A-4		0	190-100					
	5-10	Silt loam, clay, loam,	CH, CL	A-7, A-6, A-4	1 0	1 0	90-100	85-100	75-100	55-95	26-52	9-32
	!	silty clay loam, clay	!	!	!	!	!	!	!	!	!	!
	1 10 12	loam, silty clay	I CTT CT	12.7.2.6	I I 0	1 ^	100 100	   05 100	100 100	165 05	124 65	117 42
	1 10-13	Silty clay loam, clay,   silty clay, clay loam	CH, CL	A-7, A-6		1 0	90-100	182-100	180-100	105-95	134-65	117-43
	   13-28		ICH, CL	I IA-7	I I 0	1 0	190-100	I 105_100	I 100_100	170-05	142-65	124-43
		Stratified silty clay	ICH, CL	IA-7	1 0	1 0	190-100	•	•	•	•	•
	1 20 33	loam to clay to silty	I CII, CII	A	1	1	1 20 100	103 IOO	100 100	1 70 93	1 42 03	123 44
	i	clay	i	i		i	i	! !	i	<u> </u>	i	<u> </u>
	I 33-55	Stratified silty clay	CH, CL	A-7	i 0	i o	90-100	185-100	180-100	170-95	145-69	125-44
	i	loam to clay to silty	i ,	i	i	i	i	İ	İ	i	i	i
	i	clay	i	i	i	i	i	i	i	i	i	i
	55-80	Stratified very fine	SC-SM, SM,	A-6, A-4	0	1 0	190-100	85-100	60-95	35-75	16-32	2-13
	1	sandy loam to silt	ML, SC	1	I	1	1	I	I	I	1	I
	I	loam to loamy very	1	1	I	1	1	I	I	1	1	1
	1	fine sand	1	1	I	1	1	I	1	1	1	I
	1	1	1	I	I	1	1	l	1	1	1	1
433573:	1	1	1	I	I	I	1	I	I	I		1
Cornucopia		Silt loam	CL-ML, CL	A-6, A-4	0	•	97-100	•	•	•	•	•
	3-10		SC-SM, CL	A-7, A-6, A-4	1 0	0-5	97-100	95-100  -	180-100	55-95	26-52	9-32
	!	silt loam, silty clay	!	!	!	!	!	!	!	!	!	!
	1 10 20	loam, silty clay	I CT CT		I ^	1 0 5	107 100	   05 100	100 100	175 05	146 65	100 43
	10-32   32-45	· -	CL, CH  CL, CH	A-7  A-7	I 0 I 0	0-5   0-5	97-100  97-100					
		Stratified very fine	SC-SM, SM,	A-4, A-2-4	1 0	I 0-5	197-100					
	I 43-30	sandy loam to silt loam		A'4, A-2-4	1 0	I 0-5	191-100	   23-100	100-33 1	120-00 I	1 10-32	1 2-13
	1 50-72	Stratified very fine	SC-SM, SM,	  A-4, A-2-4	I I 0	I 0-5	197-100	195–100	1 165-95	130-80	116-27	1 2-10
	1 30 72	sand to silt loam	CL-ML, ML		i	1	1	, 55 ±00 I	1	1	1 2 2 /	1
	i			i	i	i	i	i	i	i	i	i

Table 14.-Engineering Properties-Continued

	,	1	Classi	fication	Frag	ments	P	ercenta		_	Ī	I
Map unit symbol	Depth	USDA texture			1 >10	. 2 10	<u>!</u>	sieve	number-	-	Liquid	
and soil name	] ]		   Unified	AASHTO	>10   in	3-10   in	I I 4	   10	   40	1 200		ticity  index
	In		i · · · · · · · · · · · · · · · · · · ·	<u> </u>	Pct	Pct	i I	i I	i	i	Pct	i I
	_	Ī	l	Ī	<u> </u>	<u> </u>	İ	l	İ	İ	<u> </u>	ĺ
433582:	ĺ	İ	İ	İ	İ	ĺ	İ	ĺ	İ	İ	İ	ĺ
Croswell	0-1	Sand	SP-SM, SM	A-3, A-2-4	0	0	80-100	75-100	35-70	5-15	0-29	NP-6
	1-7	Sand, loamy sand		A-3, A-2-4	1 0	1 0	90-100	75-100	35-75	5-30	0-26	NP-6
			SP-SM, SM	!	1		I	<u> </u>	!		1	1
	7-16	Sand, loamy sand		A-3, A-2-4	1 0	1 0	90-100	75-100	35-75	5-30	0-24	NP-6
	1 16 20	I Cond looms cond	SP-SM, SM  SC-SM,	  A-3, A-2-4	1 0	I I 0	  90-100	  75 100	125 75	I I 5-30	I I 0-14	l INP
	TO-39	Sand, loamy sand	SP-SM, SM	A-3, A-2-4	1 0	1 0	1 20-100	1 /2-100	133-75	1 2-30	1 0-14	I NP
	ı   39–60	I Sand		A-3, A-2-4	1 0	1 0	  90-100	ı 175–100	1 135-70	   5-15	0-14	I NP
	, 33 00 I		1	1	i	ı	1	/ 3 ± 5 5	1	1	1	112
433599:	İ	i	İ	i	i	İ	i	İ	i	i	i	į
Annalake	0-3	Fine sandy loam	SC-SM, SM,	A-4	0	0	90-100	85-100	65-85	30-55	18-33	2-10
	l	I	CL-ML, ML	1	1	I	I	I	I	1	1	1
	3-6		SM, CL,	A-4, A-2-4	1 0	1 0	90-100	85-100	50-95	25-75	0-28	NP-10
		, , , , , , , , , , , , , , , , , , , ,	SC-SM,	1	1	1	1	1	1	1	1	1
		sandy loam	CL-ML, ML		1	1						
	6-17	Fine sandy loam, very   fine sandy loam, sandy	SC-SM, SM,	A-4, A-2-4	1 0	0	190-100	182-100	150-95	125-75	17-28	2-10
	l I	line sandy loam, sandy	CL-ML, ML	1	1	 	1	 	1	1	1	!
	I I 17-31	•	SM, CL,	  A-4, A-2-4	1 0	1 0	1 190-100	ı 185-100	1 150-95	1 125-75	1 116-27	1 2-10
	1		SC-SM,	1	i	i	1	1	1	1	1	1 - 10
		·	CL-ML, ML	i	i	i	i	i	i	i	i	i
	31-39	=	CL-ML,	A-4, A-2-4	0	0	90-100	85-100	50-95	25-75	18-30	4-12
	l	sandy loam, loam	SC-SM, CL,	1	1	I	I	I	I	1	1	I
	l	1	SC	1	1	I	1	I	I	1	1	I
	39-60	Stratified fine sand to		A-4, A-2-4	1 0	1 0	190-100	85-100	150-95	25-80	16-27	2-10
		silt loam	SC-SM,	1	!	!	!	!	!	!	!	!
	 		CL-ML, ML		1		1		1	1	1	
433600:	] 	1	1	1	1	! !	 	! !	! !	1	1	1
Annalake	l 0-3	Fine sandy loam	SC-SM, SM,	A-4	1 0	1 0	1 190-100	ı 185–100	1 165-85	130-55	118-33	1 2-10
			CL-ML, ML	1	i	i			1	1	1	v
	3-6	Fine sandy loam, sandy		A-4, A-2-4	0	0	90-100	85-100	50-95	25-75	0-28	NP-10
	l	loam, loam, very fine	SC-SM,	1	1	I	I	I	I	1	1	I
	l	sandy loam	CL-ML, ML	1	1	I	1	I	I	1	1	1
	6-17		SC-SM, SM,	A-4, A-2-4	0	1 0	90-100	85-100	50-95	25-75	17-28	2-10
		fine sandy loam, sandy	CL-ML, ML	1	!	!	!	!	!	!	!	!
	17 21	loam	I COM CT	12.4.20.4	I I 0	I I 0	100 100	   05 100	150 05	105 75	116 07	I I 0 10
	1 17-31		SM, CL,   SC-SM,	A-4, A-2-4	1 0	1 0	1 20-100	182-100	120-92	125-75	16-27	1 2-10
	 		CL-ML, ML	1	1	! !	! !	! !	! !	1	i	! !
	ı I 31-39	• -		A-4, A-2-4	i 0	, I 0	190-100	185-100	150-95	125-75	118-30	   4-12
		sandy loam, loam	CL-ML, SC-SM	. ,	i	i			1	1	i	i
	39-60	Stratified fine sand to	. ,	A-4, A-2-4	0	0	90-100	85-100	50-95	25-80	16-27	2-10
	l	silt loam	ML, CL,	1	1	I	I	I	I	1	1	I
	l	I	CL-ML	I	1	I	1	I	I	1	1	I
	l	1	1	1	1	I	1	I	I	1	1	I

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Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	USDA texture	Classi	fication	I	Frag	ments	Pe		ge pass number-	-	  Liquid	   Plas-
and soil name	l	1	1	ī	ī	>10	3-10	ī	ı	ı	ī	limit	ticity
	l	1	Unified	AASHT	:O [	in	in	4	10	40	200	1	index
	In In	Ī	I	ı	ı	Pct	Pct	ī	ı	I	ı	Pct	ı
433671:	] i		1		ļ	l i			 		1	1	1
Arnheim	ı I 0-5	  Mucky silt loam	SC-SM, SM,	  A-4	-	0	i 0	1 100	I I 100	I 185-100	140-90	  28-61	   7-11
Armerm	1 0 3	I I I I I I I I I I I I I I I I I I I	CL-ML, ML	1 4	-	0	1	1 100	1 100	103 100	1 20 30	120 01	1 / 11
	I 5-10	  Silt loam		  A-4	i	0	i 0	1 100	100	180-100	170-90	23-33	7-12
		Very fine sandy loam,	SC-SM, SM,	IA-4	i	0	1 0	1 100	•			117-33	
	i I	silt loam, fine sandy	CL-ML, ML	 	i		i i	   	,   	   	   	   	i I I
	15-24	Silt loam, very fine	SC-SM, SM,	A-4	i	0	0	100	100	75-100	40-90	17-33	2-12
	 	sandy loam, fine sandy   loam	CL-ML, ML	 	 	 	 	 	 	 	 	 	 
	24-60	Stratified loamy fine	SC-SM, SM,	A-4	I	0	0	100	100	75-95	25-65	16-28	2-10
	l	sand to fine sandy	CL-ML, ML	1	I		1	1	l	I	1	1	1
	l	loam to very fine	1	1	I		I	1	l	I	I	1	1
		sandy loam	!	!	!		!	!	!	!	!	!	!
433676:	l i	1	1	1			!	1	l I	 		1	1
Redrim	0-1	  Moderately decomposed	'   PT	IA-8	i	0	i 0	1 100	I 100	I 100	I 100		l NP
	, · · -	plant material	i	i	i		i	1	,	, = I	i	i	i
1	1-3	Highly decomposed plant	PT	A-8	i	0	0	100	100	100	100	i	NP
	l	material	1	1	ı		I	1	l	I	I	1	1
	3-11	Very cobbly sand	SP-SM,	A-1-a	I	0-15	15-55	10-95	5-90	2-65	0-15	0-14	NP
	l	I	GP-GM, SP,	1	I		1	1	l	I	1	1	1
	l	1	GP, SM	1	I		1	1	l	I	1	1	1
	11-18	Very cobbly loamy sand,		A-1-a	ļ	0-15	15-55	10-95	5-90	2-70	0-25	0-19	NP-2
		very gravelly loamy	SM, GP,	!	. !		!		l	!	!	!	!
		sand, cobbly sand,	GP-GM	!	!		!	!	l	!	!	!	!
	1 10 00	extremely cobbly sand  Unweathered bedrock	!	!	!		!	1	l	!	!	!	1
	   18-80	Unweathered bedrock			-				 	 			
433679:	! 	i	i	i	i	! 	i	i	' 	i I	i	i	i
Lapoin	0-1	Highly decomposed plant	PT	A-8	i	0	i 0	100	100	100	100	i	i
	l	material	1	1	- 1		I	1	l	I	I	1	1
		Loam	CL-ML, CL	A-4	I	0-2		95-100					7-13
	4-7	Loam, sandy loam, sandy	SC, CL	A-6, A-4	I	0-2	0-5	95-100	90-100	55-95	25-75	24-43	6-17
	l	clay loam, fine sandy	1	1	I		1	1	l	I	1	1	1
		loam	1	! _	ļ		!			<u> </u>	ļ		
	7-19	Clay, loam, clay loam,	CL, CH	A-7, A-6	!	0-2	0-5	95-100	90-100	75-100	55-95	37-61	118-37
	1 10 24	silty clay loam	I CT CP	I IA-7		   0-2	I I 0-5	  95-100	   00_100	   00_100	   65- 05	145.60	125 44
	19-34 	Clay, clay loam, silty   clay, silty clay loam	CL, CH	A-/	!	U-2	1 0-5	1 132-T00	1 1 20-100	1 100-100	05-95	145-09	125-44
	I I 34–30		SC-SM, SC	  A-4, A-2	-	0-2	I 0-5	  95-100	I I9∩–1∩∩	।  55-25	1 125-55	1 116-27	1 2-10
	, J <del>.</del> J9 I	loam	1		- :	, , ,	, , ,	1 20 100	, 50 ±00	, 33 03 I	123 33	1 2 7	1
	I 39-80	Unweathered bedrock	·	i	i	, 		· 					
	, <b>v</b> I	1	i	i	i		i	i	i	i	i	i	i

Table 14.-Engineering Properties-Continued

	I	I	Classi	fication	Frag	ments	l Po		ge pass	-	1	I
Map unit symbol	Depth	USDA texture	1		1		<u> </u>	sieve	number-		Liquid	Plas-
and soil name	I	1	1	1	>10	3-10	1	I	1	1	limit	ticity
	1	1	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	1	1	1	Pct	Pct	1	I	1	1	Pct	I
	. —	1	1	1	1		I	I	I	I		1
433686:	I	1	1	1	1	I	I	I	I	I	1	I
Zeba	0-2	Sandy loam	SM	A-2-4, A-4	1 0	0-30	85-100	75-100	40-70	20-40	20-35	2-10
	2-5	Sandy loam, cobbly fine	SC-SM, SM,	A-4, A-2-4,	1 0	0-30	85-100	75-100	35-85	15-55	0-25	NP-7
	İ	sandy loam, loamy sand	CL-ML, ML	A-1-b	İ	İ	İ	İ	İ	İ	İ	İ
	5-13	Sandy loam, cobbly fine	SC-SM, SM,	A-4, A-2-4,	0	0-30	85-100	75-100	40-85	15-55	0-23	NP-6
	İ	sandy loam, fine sandy	CL-ML, ML	A-1-b	İ	İ	İ	İ	İ	İ	İ	İ
	i	loam, cobbly sandy loam	i ´	i	i	i	i	i	i	i	i	i
	13-21	Sandy loam, fine sandy	SC-SM, SM,	A-4, A-2-4,	i 0	0-15	85-100	75-100	40-85	15-55	116-27	2-10
	i		CL-ML, ML	A-1-b	i	i	i	i	i	i	i	i
	I 21-33	Sandy loam, fine sandy		A-4, A-2-4,	i o	I 0-15	85-100	75-100	135-85	15-55	115-25	I 1-7
	i	loam, loamy sand	CL-ML, ML	I A-1-b	i	i	i	i	i	i	i	i
	I 33-80	Unweathered bedrock			i	i	i	i	i	i	i	i
	i	i	i	i	i	i	i	i	i	i	i	i
433729:	i	i	i	i	i	i	i	i	i	i	i	i
Sultz	I 0-2	  Highly decomposed plant	I PT	IA-8	i 0	i 0	I 100	I 100	I 100	I 100		
	i	material	i	i	i	i	i	 I	i	i	i	i
	2-6	•	SP-SM, SM	A-3, A-1-b	i o	I 0-7	80-100	175-100	140-75	I 5-30	0-20	NP-2
		-	SP-SM, SM	A-3, A-1-b			80-100				•	•
		-	SP-SM, SM	A-3, A-1-b			80-100					
			SP-SM, SM	A-3, A-1-b	•		180-100					
	•	Stratified sand to fine	. ,	A-4, A-2-4			190-100		•	•	•	
	1	·	CL-ML, ML	1	i		1	1	1	1	1	1
	i	very fine sandy loam	1	<u> </u>	i	i	i		i	i	i	
	<u> </u>	I very rime samay roam	<u> </u>	<u>'</u>	<u> </u>	i	i	! !	<u> </u>	i	i	! !
433739:	i	i	<u> </u>	i	i	i	<u> </u>		<u> </u>	<u> </u>	i	' 
Moquah	I 0-5	  Fine sandy loam	SM, SC-SM	  A-4	i 0	i 0	I 100	100	170-85	140-55	25-33	I 6-10
11044411		Stratified fine sandy	ISC, SC-SM,	A-4	1 0	1 0	1 100		•	•	120-31	
	1 3 13	loam to silt loam to	CL, CL-ML	1	i		1	1	1	1	1	
	i	fine sand	1	i	i	i	<u> </u>		<u> </u>	<u> </u>	i	' 
	'   19-48	Stratified very fine	ISC-SM,	  A-4	i 0	i 0	1 100	1 100	170-85	140-55	120-31	ι Ι 4-12
	1 13 40	sandy loam to silt	CL-ML, CL	1 4	1	1	1 100	1 100	1	1 20 33	120 31	1 7 12
	<u> </u>	loam to fine sand	I CE ME, CE	<u>'</u>	<u> </u>	i	i	! !	<u> </u>	i	i	! !
	Ι Ι 10-55	Silt loam	SC-SM, CL-ML	   2 = 1	i 0	1 0	1 100	1 100	190-100	170-90	123-33	I I 7-12
		Stratified sand to fine		A-2, A-1-b	1 0	1 0	1 100		•	•	0-21	•
	1 33 00	sand	I SH, SH	1 A Z , A I D	1	1	1 100	1 100	130 00	1 2 22	1 0 21	TAE J
	! 	Sand	1	1	1	1	1	! !	1	! !	1	! 
433802.	! !	1	1	1	1	!		! !	-	1	1	! !
Udorthents,	! !	1	1	1	1	!		! !	-	1	1	! !
ravines and	! !	1	1	1	1	!		! !	-	1	1	! !
excarpments	1	1	1	1	!	!	!	1	!	1	1	1
evcarbments	1	1	1	1	!	!	!	1	!	1	1	1
	I	I	1	I	1	I	I	I	I	ı	1	I

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	USDA texture	Class	sification	Frag	ments	Po	ercenta	ge pass number-	-	  Liquid	   Plas-
and soil name	<u>.</u> -		i	1	>10	I 3-10	<del>i</del>	ī	ī	ī	limit	
	i i	i	Unified	AASHTO	in	in	4	10	40	200		index
	In	1	Ī		Pct	Pct	ī	ī	ī	ī	Pct	ī
		1	1	1			1	I	I	1	1	1
452765:	I	1	1	1	1	1	1	I	I	1	1	1
Abbaye	0-2	Slightly decomposed	PT	A-8	1 0	0	100	100	100	100		
	l	plant material	1	1	1	1	1	I	I	1	1	1
		Sandy loam	SM, SC-SM	A-4, A-2-4	1 0	0-7	85-100	75-100	45-70	25-40	0-25	2-7
	4-13	Loamy sand, loamy fine	SM, SC-SM	A-4, A-2-4	1 0	0-7	85-100	75-100	40-85	15-55	0-28	NP-9
	l	sand, fine sandy loam,	1	I	1	1	1	I	I	1	1	1
	I	sandy loam	1	ı	1	1		I	1	1		
	13-25	Sandy loam, fine sandy	SM, SC-SM, S	SC A-4, A-2-4	1 0	0-7	85-100	75-100	45-85	25-55	17-28	2-10
	l	loam	1	1	1	1	1	1	1	1	1	1
	25-32	Sandy loam, loamy sand,	SC-SM, SC	A-4, A-2-4	1 0	0-7	85-100	75-100	40-85	15-55	18-30	4-12
		fine sandy loam	1	!	!	!	1	!	1	1	1	1
	32-80	Unweathered bedrock			!	!		!	!	!	!	!
<b>.</b>	01	1771-3-7	1	1.7.0	I I 0	1 0	1 100	1 100	1 100	1 100	!	!
Lapoin	,   0-T	Highly decomposed plant   material	PT	A-8	1 0	1 0	100	100	100	100		
	1 1 1	Material  Loam	  CL-ML, CL	I IA-4	I I 0-2	I 0-5	  95-100	I 100 100	175 05	166 76	126 40	   7-13
	•	Loam, sandy loam, sandy	. ,	A-4  A-6, A-4	1 0-2	•	195-100		•	•	•	•
		clay loam, fine sandy	ISC, CL	A-0, A-4	1 0-2	1 0-2	193-100	1 130-100	122-32	125-75	124-43	1 0-17
		loam	1	<u> </u>	i	;	1	! !	<u>'</u>	<u> </u>	<u> </u>	<u> </u>
	•	Clay, loam, clay loam,	ICT. CH	  A-7, A-6	1 0-2	1 0-5	95-100	ı 190–100	ı 175–100	155-95	137-61	118-37
	1 , 13	silty clay loam	1	1	1 0 -	1	1	1	/	1	1	1
	I 19-34	Clay, clay loam, silty	ICL, CH	IA-7	i 0-2	I 0-5	95-100	90-100	180-100	165-95	145-69	125-44
		clay, silty clay loam	1	i	i	i	1		 	1	1	i
		Sandy loam, fine sandy	SC-SM, SC	A-4, A-2	0-2	0-5	95-100	90-100	55-85	25-55	116-27	2-10
	I	loam	i	į ′	i	i	i	İ	i	i	i	i
	39-80	Unweathered bedrock										
	l	1	1	1	1	1	1	I	I	1	1	1
1383557:	l	1	1	1	1	1	1	I	I	1	1	1
Au Gres	0-2	Highly decomposed plant	PT	A-8	1 0	0	100	100				NP
	l	material	1	I	1	1	1	I	I	1	1	1
	2-5	Loamy sand	SP-SM, SM,	A-3, A-2-4,	1 0	1 0	95-100	85-100	25-75	5-30	0-25	NP-7
		!	SC-SM	A-1-b	!	!		<u> </u>	I	!	!	! _
	5-8	Loamy sand, sand, loamy		A-3, A-2-4,	1 0	1 0	95-100	85-100	25-75	5-30	0-25	NP-7
		coarse sand	SC-SM	A-1-b	!	1	105 100	105 400	105 55		1 0 05	
	8-T9	Loamy sand, sand, loamy		A-3, A-2-4,	1 0	1 0	95-100	182-100	125-75	5-30	0-25	INP-7
	1 16 20	coarse sand	SC-SM	A-1-b	I I 0	1	105 100	   0	105 75	I I 5-30	1 0 05	IND 7
	1 10-28	Sand, loamy sand,   coarse sand	SP-SM, SM,   SC-SM	A-3, A-2-4,   A-1-b	1 0	1 0	95-100	182-100	125-75	1 2-30	0-25	INP-/
	I 28-60	Sand, coarse sand	SP-SM, SM	A-1-B  A-3, A-2-4,	1 0	1 0	195-100	I 185-100	1 125-70	1 5-25	1 0-14	I NP
	20-00 	Sand, Coarse Sand	I SP-SM, SM	A-1-b	0	1 0	193-100	1 192-100	125-70	1 3-23	1 0-14	NE
	' 		i	1 4 1 5	i	i	i	I	i	i	i	i
1383580:	I		i	i	i	i	i	I	i	i	i	i
Loxley	I 0-13	  Mucky peat	'  PT	  A-8	i o	i 0	1 100	1 100	1 100	1 100	i	'   NP
· - <u>-</u>	13-60		PT	A-8	i o	i 0	100	100	100	1 100	i	NP
						:	:			:		:

Table 14.—Engineering Properties—Continued

Map unit symbol	   Depth	USDA texture	Classi	fication	Frag 	ments	Po		ge passi number-		  Liquid	    Plas-
and soil name	I	1		1	>10	3-10	ī	ī	I	l I	limit	ticity
	1	1	Unified	AASHTO	in	in	4	10	40	200	I	index
	In	I	I	1	Pct	Pct	ı	ı	I	I	Pct	Ī
	1	!	!	!	l	!	ļ	!		l	!	1
1383580:	!		I								!	!
Beseman	•	Muck	PT	A-8	0	1 0		100		100		
	36-60   	Loam, silt loam, sandy   loam	SC-SM,   CL-ML, CL	A-2-4, A-4   	0   	0-2   	80-100   	75-100   	45-100    	25-90   	20-33   	4-13   
Dawson	0-8	Peat	PT	A-8	0	0	100	100	100	100		i
	8-38	Muck	PT	A-8	0	0	100	100	100	100		
	38-40	Silt loam, loam, fine	ML, SM	A-4, A-2-4	0	0	100	100	50-100	10-90	0-59	NP-9
	İ	sand, mucky sand	İ	İ	İ	İ	İ	İ	İ	İ	İ	i
	40-60	Sand, gravelly sand,	SP, SP-SM,	A-3, A-4,	0	1 0	45-100	35-100	15-90	0-45	0-23	NP-6
	1	very gravelly very	GP, SM	A-1, A-2	I	I	I	I	1	I	I	1
	1	fine sand	I	1	l	I	I	I	1	l	I	1
1383581:												1
Rifle	I 0-4	  Peat	  PT	  A-8	I I 0	I I 0	1 100	I I 100	I I 100	I I 100	 	I NP
11110	•	Mucky peat	IPT	IA-8	1 0	•	1 100	1 100	1 100	100	' 	l NP
	i		İ		j	İ		 			i	i
1383603:	1	1	1	1	l	I	I	I	1	l	I	1
Cornucopia	I 0-3	Silt loam	CL-ML, CL	A-6, A-4	0	0-5	97-100	95-100	80-100	70-90	22-41	6-18
	J 3-10	Very fine sandy loam,	SC-SM, CL	A-7, A-6, A-4	0	0-5	97-100	95-100	80-100	55-95	26-52	9-32
	I	silt loam, silty clay	1	1	l	I		I		l	I	1
	I	loam, silty clay	1	1	l	I		I		l	I	1
	10-32	Clay	[CL, CH	A-7	0	•	•	•	90-100	•	•	•
	32-45	Clay	[CL, CH	A-7	0	0-5	97-100	95-100	90-100	75-95	46-65	28-43
	45-50	Stratified very fine	SC-SM, SM,	A-4, A-2-4	0	0-5	97-100	95-100	60-95	20-80	16-32	2-13
	1	sandy loam to silt loam		1	l	I	1	I		l	I	1
	50-72	Stratified very fine	SC-SM, SM,	A-4, A-2-4	0	0-5	97-100	95-100	65-95	30-80	16-27	2-10
	1	sand to silt loam	CL-ML, ML	!	l	!	1	!	<u> </u>	l	!	1
1383658:	 	1	1	1	 	 	 	 	 	 	 	1
Deerton	I 0-1	  Highly decomposed plant	I I DT	A-8	I 0	i I 0	1 100	1 100	1 100	1 1 100	I	l NP
Deer con	1 0 1	material	1	I		1	1 100	1 100	1 100	±00	<u>.</u>	1 442
	I 1-9	Sand	SP-SM, SM	A-3, A-2-4,	I 0-7	0-30	1 155-100	1 145-100	125-70	I 0-15	ı I 0-26	IND-6
	1 - 7	I		A-1-b	,	1 0 30	1	1 43 100	123 70	1 0 13	1 0 20	1
	   9-10	  Loamy sand, sand,	•	A-3, A-2-4,	ı I 0-7	I 0-30	155-100	45-100	125-75	ı I 0-30	I 0-26	INP-7
	i	channery loamy sand,	1	A-1-b	, • . I	1	1	1	1	,	1 0 -0	1
	i i	flaggy sand	i	<b>-</b> -	I	i	i	i	I	I	i	i
	1 10-25	Sand, loamy sand,	SP-SM, SP, SM	A-3, A-2-4.	I 0-7	I 0-30	55-100	45-100	  25-75	I 0-30	I 0-26	NP-7
	 I	channery loamy sand,		A-1-b	, • . I	, , , ,,, I	1	, -5 -50 I	U . U	,	 I	1
	i i	flaggy sand	i	<b>-</b> -	I	i	i	i	I	I	i	i
	1 25-39	Heathered bedrock	· 									i
		Unweathered bedrock		· 	I		· 			I		· i
	<b></b>	1	i	i	I	İ	i	i	i	I	i i	i

Table 14.—Engineering Properties—Continued

								-			:
Depth	USDA texture	<u> </u>				<u>!</u>	sieve	number-	<del>-</del>	Liquid	
	I	!	!	•	•	•			!		ticity
	l	Unified	AASHTO	<del>`</del>	<u>.                                    </u>	4	1 10	40	200	<u>.                                    </u>	index
In	I	1	1	Pct	Pct	1	1	1	1	Pct	1
	1		!	- !	!	!	!	!	!	!	!
0 0		 	1 0	! ^	1 ^	1 100	1 100	1 100	I I 100	!	
	material	 	 	i	1	i	İ	İ	100 		NP 
2-12	Very cobbly sand   	SM, SP,   SP-SM, GM,   GP, GP-GM	A-3, A-1-b   	0-15   	15-55   	20-95   	10-85   	5-65   	3-30   	0-14   	NP   
	coarse sand, extremely		A-3, A-1-b         	0-15         	15-55         	20-95         	10-85           	5-70           	0-25           	0-24       	NP-2         
	extremely gravelly   coarse sand, extremely   cobbly coarse sand,   gravelly loamy coarse	SP-SM, GM,	A-3, A-1-b           	0-15         	15-55         	20-95         	10-85           	5-70         	0-25         	0-22         	NP-2           
			A-3, A-1-b           	0-15           	15-55           	20-95         	10-85           	5-70         	0-25           	0-19         	NP-2           
33-80	Unweathered bedrock										
	1				1	1	1	 	I 1	1	1
		  PT 	A-8	0	0	1 100	1 100	   100 	   100 		   NP 
	•			0-7	0-30	  55-100	  45-100	25-70 	0-15 	0-26	  NP-6 
	channery loamy sand,	•	•	i 0-7 I	0-30 	55-100   	45-100   	25-75   	0-30   	0-26   	NP-7   
10-25	Sand, loamy sand,   channery loamy sand,	SP-SM, SP, SM 	A-3, A-2-4,   A-1-b	0-7   	0-30 	55-100 	45-100 	25-75   	0-30 	0-26 	NP-7 
		· 	·	i	i	· 	· 			· 	· 
	Unweathered bedrock	i		i	i	· i	· i	I	I	· i	· 
	0-2 2-12 12-15 15-23 23-33 33-80 0-1 1-9 9-10 10-25 25-39	0-2   Highly decomposed plant   material   2-12   Very cobbly sand	O-2   Highly decomposed plant   PT	In	In	Unified   AASHTO   in   in   in   In   In   In   In   In	Unified   AASHTO   in   in   4	Unified   AASHTO   in   in   4   10		Name	In

Table 14.-Engineering Properties-Continued

	I	I	Classi	fication	Frag	ments	l P	ercenta		-	I	1
Map unit symbol	Depth	USDA texture	l		<u> </u>		<u> </u>	sieve	number-		Liquid	
and soil name	I	I	1	1	>10	3-10	1	1	I	1	limit	ticity
	1	l	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	1	1	1	Pct	Pct	1	1	1	1	Pct	1
	1	1	1	1	1	1	1	1	1	1	1	1
1383660:	I	1	1	1	1	1	1	1	I	I	1	I
Brownstone	0-2	Highly decomposed plant	PT	A-8	0	0	100	100	100	100		NP
	I	material	1	1	1	1	1	1	1	1	1	1
	2-12	Very cobbly sand	SM, SP,	A-3, A-1-b	0-15	15-55	20-95	10-85	5-65	3-30	0-14	NP
	I	1	SP-SM, GM,	1	1	1	1	1	1	1	1	1
	I	1	GP, GP-GM	1	1	1	1	1	1	1	1	1
	12-15	Extremely gravelly	SM, SP,	A-3, A-1-b	0-15	15-55	20-95	10-85	5-70	0-25	0-24	NP-2
	I	coarse sand, extremely		I	1	1	1	1	I	1	1	1
	I	cobbly sand, extremely	GP, GP-GM	1	1	1	1	1	I	1	1	I
	I	cobbly coarse sand,	1	1	1	1	1	1	I	I	1	I
	I	gravelly loamy coarse	1	1	1	1	1	1	I	1	1	1
	1	sand	1	1	1	1	1	1	1	1	1	1
	15-23	Extremely cobbly sand,	SM, SP,	A-3, A-1-b	0-15	15-55	20-95	110-85	5-70	0-25	0-22	NP-2
İ	!	extremely gravelly	SP-SM, GM,	!	!	!	!	!	!	!	!	!
	!	coarse sand, extremely	GP, GP-GM	!	!	!	!	!	!	!	!	!
	!	cobbly coarse sand,	!	1	1	!	1	!	1	!	!	!
	!	gravelly loamy coarse	!	1	!	!	1	!	!	!	!	!
	1 22 22	Extremely cobbly coarse	I CM CD	  A-3, A-1-b	1 0 15	116 66	1 120-95	110 05	ı I 5-70	I 0-25	I 0-19	INTO 2
	23-33	sand, extremely cobbly		A-3, A-1-D	1 0-13	113-33	120-95	110-02	1 5-70	1 0-25	1 0-19	INP-Z
	:	sand, extremely cobbly	GP, GP-GM	1	1	!	1	!	1	!	!	!
	:	gravelly coarse sand,	GF, GF-GM	1	1	1	1	!	1	!		!
	:	gravelly loamy coarse	<u> </u>	1	<u> </u>	;	;		<u>'</u>	:	;	
	i	sand	<u> </u>		i	i	i	<u> </u>	i	i	i	<u> </u>
	33-80	Unweathered bedrock	i		i	i					i	
	1	I	i	i	i	i	i	i	i	i	i	i
1383662:	i	i	i	i	i	i	i	i	i	i	i	i
Abbaye	I 0-2	Slightly decomposed	IPT	IA-8	i o	i 0	i 100	I 100	I 100	i 100	i	i
-	i	plant material	i	i	i	i	i	i	i	i	i	i
	2-4	Loamy sand	SM, SC-SM	A-2-4	i 0	0-7	185-100	75-100	40-75	115-30	0-33	NP-10
	4-13	Loamy sand, loamy fine	SM, SC-SM	A-4, A-2-4	0	0-7	85-100	75-100	40-85	15-55	0-28	NP-9
	I	sand, fine sandy loam,	1	i .	1	I	1	I	I	I	1	I
	I	sandy loam	I	I	1	I	1	I	I	I	1	I
	13-25	Sandy loam, fine sandy	SM, SC-SM, SC	A-4, A-2-4	0	0-7	85-100	75-100	45-85	25-55	17-28	2-10
	I	loam	I	I	1	I	1	I	I	I	1	I
	25-32	Sandy loam, loamy sand,	SC-SM, SC	A-4, A-2-4	1 0	0-7	85-100	75-100	40-85	15-55	18-30	4-12
	I	fine sandy loam	1	I	1	1	1	I	I	I	1	I
	1 32-80	Unweathered bedrock	1	1	1	1	1	1	1	1	1	1

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	USDA texture	Class	sification	Frag 	ments	P		ge pass number-		  Liquid	   Plas
and soil name		1		1	>10	3-10	1	<u> </u>		l I	limit	ticit
	İ	i	Unified	AASHTO	in	in	4	10	40	200		index
	In	<u>.</u>	I	<u> </u>	Pct	Pct	!	<u> </u>	Ī	I	Pct	Ī
1383665:		1	1		l I		1	 	 	 	1	1
Allendale	0-3	Loamy fine sand	SM	A-4, A-2-4	0	0	95-100	90-100	65-80	25-40	0-31	NP-6
	3-10	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-4,	0	0	95-100	90-100	45-85	5-40	0-28	NP-10
		fine sand, sandy loam,	1	A-1-b, A-2-4	l	1	1	I	I	I	1	I
		fine sandy loam	İ	i	l	İ	Ì	ĺ	İ	İ	İ	İ
	10-13	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	0	1 0	95-100	90-100	45-80	5-40	0-23	NP-6
 		fine sand, loamy sand	1	A-1-b, A-2-4	l	1	1	I	I	I	1	I
	13-26	Sand, fine sand, loamy	SP-SM, SM	A-2-4,	0	1 0	95-100	90-100	45-80	5-40	0-23	NP-6
		fine sand, loamy sand	1	A-1-b, A-4,	l	1	1	I	I	I	1	I
   2 		1	1	A-3	l	1	1	I	I	I	1	I
	26-28	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	0	1 0	95-100	90-100	45-80	5-40	0-23	NP-6
		fine sand, loamy sand	1	A-1-b, A-2-4	l	1	1	I	I	I	1	I
	28-34	Clay, silty clay	CH	A-7	0	1 0	100	98-100	90-100	75-95	49-69	29-44
	34-60	Clay, silty clay	CH	A-7	0	1 0	100	98-100	90-100	75-95	49-69	29-44
		1	1	1	l	1	1	I	I	I	1	1
Wakeley	0-4	Muck	PT	A-8	0	1 0	100	100	100	100		
_	4-23	Loamy sand, sand, loamy	SP-SM, SM,	A-4, A-3,	0	0-5	90-100	80-100	40-90	5-45	0-24	NP-6
		fine sand, fine sand	SC-SM	A-2-4	l	1	1	I	I	I	1	I
	23-28	Loamy sand, sand, loamy	SP-SM,	A-4, A-3,	0	0-5	90-100	80-100	40-90	5-45	0-24	NP-6
		fine sand, fine sand	SC-SM, SM	A-2-4	l	1	1	I	I	I	1	I
	28-80	Clay, silty clay	[CL, CH	A-7	0	1 0	95-100	90-100	190-100	75-95	49-69	29-44
		I	1		l	1	1	1	1	1	1	1
Kinross	0-6	Muck	PT	A-8	0	1 0	100	100	100	100		
	6-10	Sand, fine sand, loamy	SP-SM, SM	A-3, A-2-4	0	1 0	100	90-100	50-80	5-30	0-24	NP-6
		sand, loamy fine sand	1		l	1	1	1	1	1	1	1
	10-12	Sand, fine sand, loamy	SP-SM, SM	A-3, A-2-4	0	1 0	100	90-100	50-80	5-30	0-31	NP-6
		sand	1	1	l	1	1		1	1	1	1
	12-24	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	1 0	100	90-100	50-80	5-30	0-26	NP-6
	24-42	Sand, fine sand	SP-SM, SM	A-2-4, A-3	0	1 0	100	90-100	50-80	5-30	0-26	NP-6
	42-60	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	1 0	100	90-100	50-80	I 5-30	I 0-23	NP-6

Table 14.-Engineering Properties-Continued

	I	1	Classi	fication	Frag	ments	l P	ercenta		-	1	I
Map unit symbol	Depth	USDA texture	1		1		<u> </u>	sieve	number-		Liquid	l  Plas-
and soil name	l	1	1	1	>10	3-10	•	1	I	1	•	: ticity
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	4	10	40	200	<u> </u>	index
	In	1	1	1	Pct	Pct	1	1	I	1	Pct	1
		1	1	1			1	1	I	I	1	1
1383960:	l	1	1	1	1	1	1	1	I	1	1	1
Flink	0-2	Moderately decomposed	PT	A-8	1 0	1 0	100	100	100	100		
	l	plant material	1	1	1	1	1	1	1	1	1	1
	2-3 	Highly decomposed plant	PT	A-8 	0	J 0	100	100	100 	100 		
	I 3-6	Sand	SP-SM, SM	  A-3, A-1-b	i 0	, I 0	190-100	85-100	140-70	I 5-15	0-24	INP-2
		Sand, loamy sand, fine	'	A-3, A-1-b	i 0			185-100				
	, I	sand, loamy fine sand	1	1	i	i	i		, I	i	i	i
	9-26	· -	SP-SM, SM	A-3, A-1-b	0	0	90-100	85-100	40-80	5-45	0-29	NP-6
	l	sand, loamy fine sand	İ	İ	Ì	İ	ĺ	İ	ĺ	İ	İ	İ
	26-35	Sand, fine sand	SP-SM, SM	A-3, A-1-b	1 0	0	90-100	85-100	40-80	5-25	0-17	NP-1
	35-46	Sand, fine sand	SP-SM, SM	A-3, A-1-b	0	0	90-100	85-100	40-70	5-25	0-17	NP-1
	46-52	Stratified silt to	SC-SM,	A-6, A-4	0	0	90-100	85-100	85-95	75-95	20-44	6-25
	l	silty clay loam	CL-ML, CL	1	1	1	1	1	I	1	1	1
	52-80	Stratified silt to	SC, SC-SM,	A-6, A-4	0	1 0	90-100	85-100	80-95	35-95	16-44	2-25
	!	silty clay loam to	CL, CL-ML	1	1	1	1	!	!	1	!	1
		loamy very fine sand	1	1				!				
1444357:	! 	İ	 			! 	 		! 	 		
Arnheim	0-5	Mucky silt loam	SC-SM, SM,	A-4	1 0	0	100	100	85-100	40-90	28-61	7-11
	I	1	CL-ML, ML	1	1	1	I	1	I	I	1	1
		Silt loam	SC-SM, CL-ML	A-4	0	0	100	100	80-100	70-90	23-33	7-12
	10-15	Very fine sandy loam,	SC-SM, SM,	A-4	0	0	100	100	75-100	40-90	17-33	2-12
	l	·	CL-ML, ML	1	1	I		1	I	I	1	1
	l	loam	1	1	1	1	1	1	1	1	1	1
	15-24	Silt loam, very fine	SC-SM, SM,	A-4	1 0	1 0	100	100	75-100	140-90	117-33	2-12
	!	sandy loam, fine sandy	CL-ML, ML	!	!	!	!	!	!	!	!	!
	1 04 60	loam	100.01	15.4	1 0	1	1 100	1 100	 	105 65	116.00	1 0 10
	24-60	Stratified loamy fine   sand to fine sandy	SC-SM, SM,   CL-ML, ML	A-4	1 0	1 0	100	100	75-95	125-65	116-28	1 2-10
	! !	loam to very fine	CL-ML, ML	1	1	1	!	!	! !		!	!
	! !	sandy loam	1	1		 			! !	1	-	
	i I	Sandy Toam	1	1	1	1	 	1	! 	! !	1	1
1444367.	I		i	i	i	i	i	i	i	i	i	i
Udorthents,	i	i	i	i	i	i	i	i	i	i	i	i
ravines and	İ	i	i	i	i	i	i	i	i	i	i	i
escarpments	İ	İ	İ	İ	İ	İ	İ	i	İ	İ	İ	i
_	I	1	1	1	I	1	I	I	I	I	1	1

Table 14.-Engineering Properties-Continued

			Classi	fication	Frag	ments	P	ercenta		_		l
Map unit symbol	Depth	USDA texture	!		<u> </u>		<u>!</u>	sieve	number-	<del>-</del>	Liquid	
and soil name		!	=====================================		>10	3-10	•	1 10	40		limit	
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	<u> 4</u>	1 10	1 40	1 200	<del></del>	lindex
	In In	1	1	1	Pct	Pct	1	1	!	1	Pct	
1444070		!	!	!	!	!	!	!	!	!	!	!
1444378:	1 0 4	Ining and last	I CO CM CT MT	13.4	I I 0-5	1 0 7	100 100	175 05	 	120 50	101 25	1 4 10
Wakefield		Fine sandy loam	SC-SM, CL-ML	A-4		0-7	•	•	•	•	21-35	•
	4-/ 	Fine sandy loam, loam,   silt loam		 	0 	0-7 	  80-100	/5-95 	55-95 	30-85 	17-28 	3-10
	7-18	Fine sandy loam, loam,	SC-SM, CL-ML	A-4	0	0-7	80-100	75-95	55-95	30-85	18-30	4-12
	l	silt loam	1	1	I	1	1	1	I	1	1	I
	18-24	Very fine sandy loam,	CL	A-6	J 0	0-7	80-100	75-95	65-90	40-70	20-32	6-13
		loam	1	1	l	1	1	1	I	1	1	1
	24-36	Fine sandy loam, loam,	CL	A-6	0	0-7	80-100	75-95	45-95	25-75	22-38	7-19
	l	sandy loam, clay loam	1	1	l	1	1	1	I	1	1	1
	36-49	Loam, clay loam	CL	A-6	0	0-7	80-100	75-95	65-95	50-75	27-40	12-21
	49-64	Fine sandy loam, loam,	SC, SC-SM,	A-6, A-4	0	0-7	80-100	75-95	55-90	30-70	20-32	6-13
	l	very fine sandy loam	CL, CL-ML	1	l	1	1	1	I	1	1	1
	l	I	1	1	l	1	1	1	I	1	1	1
1444379:	l	I	1	1	l	1	1	1	I	1	1	1
Wakefield	•	Fine sandy loam	SC-SM, CL-ML	A-4	0-5						21-35	
	4-7	Fine sandy loam, loam,	1	1	0	0-7	80-100	75-95	55-95	30-85	17-28	3-10
	l	silt loam	1	1	l	1	1	1	I	1	1	1
	7-18	Fine sandy loam, loam,	SC-SM, CL-ML	A-4	0	0-7	80-100	75-95	55-95	30-85	18-30	4-12
	l	silt loam	1	1	l	1	1	1	I	1	1	1
		Very fine sandy loam,	CL	A-6	0	0-7	80-100	75-95	65-90	40-70	20-32	6-13
	•	loam	1	1	l	1	1	1	I	1	1	1
	24-36	Fine sandy loam, loam,	CL	A-6	0	0-7	80-100	75-95	45-95	25-75	22-38	7-19
	l	sandy loam, clay loam	1	1	l	1	1	1	I	1	1	1
	36-49	Loam, clay loam	CL	A-6	0	•	•	•	•	•	27-40	•
	49-64	Fine sandy loam, loam,	SC, SC-SM,	A-6, A-4	0	0-7	80-100	75-95	55-90	30-70	20-32	6-13
	l	very fine sandy loam	CL, CL-ML	1	l	1	1	1	I	1	1	1
	l	I	1	1	l	1	1	1	I	1	1	1
1444388:		I	1	1	l	1	1	1	I	1	1	l
Allendale		Loamy fine sand	SM	A-4, A-2-4	1 0	•	•	•	•	•	0-31	•
	3-10	Sand, loamy sand, loamy		A-3, A-4,	1 0	1 0	95-100	90-100	45-85	5-40	0-28	NP-10
	l	fine sand, sandy loam,	1	A-1-b, A-2-4	l	1	1	1	I	1	1	I
	l	fine sandy loam	1	1	Ι .	Ι	1	1	l	1	1	Ι
	10-13	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	1 0	0	95-100	90-100	45-80	5-40	0-23	NP-6
	l	fine sand, loamy sand	1	A-1-b, A-2-4		1	1	1	I	1	1	I
	13-26	Sand, fine sand, loamy	SP-SM, SM	A-2-4,	1 0	0	95-100	90-100	45-80	5-40	0-23	NP-6
	l	fine sand, loamy sand	1	A-1-b, A-4,	I	1	1	I	I	1	1	1
			1	A-3		1	1	1	!	1	1	1
		Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	1 0	1 0	95-100	90-100	45-80	5-40	0-23	NP-6
		fine sand, loamy sand	1	A-1-b, A-2-4		Ι .	1	1	1	1	1	1
		Clay, silty clay	CH	A-7	1 0	•					49-69	
		Clay, silty clay	ICH	IA-7	1 0	1 0	I 100					29-44

Table 14.—Engineering Properties—Continued

Map unit symbol	   Depth	USDA texture	Classi	fication	Frag	ments	P	ercenta	ge pass: number-	-	  Liquid	   Plas-
and soil name	l	I	1	l	>10	3-10	ī	ı	Ī	ı	limit	ticity
	l	İ	Unified	AASHTO	in	in	4	10	40	200	Ì	lindex
	<u>In</u>	<u> </u>	Ī.	I	Pct	Pct	Ī.	l	!	l	Pct	Ī
1444402:	 	 	 	! 	 	 		 	! 	 		
Tonkey	0-8	Sandy loam	SM, SC-SM	A-4, A-2	0	0	100	100	60-70	30-40	27-44	4-12
	8-14 	Sandy loam, loam, very   fine sandy loam	SM, SC-SM, SC	A-4, A-2 	0 	I 0	100 	100 	60-90 	30-70 	16-30 	2-12 
		Loam, sandy loam, very   fine sandy loam	SM, SC-SM, SC	A-4, A-2 	0 	I 0	100 	100 	60-90 	30-70 	16-30 	2-12 
	28-60 	Stratified sand to loam   to silt loam		A-3, A-4,   A-1, A-2	0 	0 	95-100 	90-100 	40-80 	5-65 	0-32 	NP-13 
1444410:	! 	 	İ	! 	i I	i I	İ	i I	i I	i	i	i
Tula		Highly decomposed plant   material	PT 	A-8 	0 	I 0	100 	100 	100 	100 	 	 
	1-5	Fine sandy loam	CL-ML, SM, ML	A-4	0-7	2-30	80-95	75-85	50-75	30-50	0-29	NP-6
	İ		SC-SM, ML	<b>A - 4</b>       	0-7       	2-30         	80-95         	75-85         	50-75         	30-50         	0-22       	NP-4       
	8-20       	Cobbly very fine sandy   loam, cobbly fine   sandy loam, very fine   sandy loam, fine sandy   loam	CL-ML, ML	<b>A-4</b>       	0-7       	2-30       	80-95         	75-85         	50-85       	30-55         	0-26       	NP-7       
	 	Gravelly sandy loam,   sandy loam, fine sandy   loam, gravelly fine   sandy loam	. , ,	A-4, A-2-4     	0-7     	2-30     	80-95     	75-85     	<b>4</b> 0-75     	20-50     	0-26   	NP-7   
	28-37 	Gravelly sandy loam,   gravelly loamy sand	SM, SC-SM 	A-2-4 	0-7 	2-25 	65-95 	65-90 	30-70 	15-35 	0-23 	NP-6 
1	37-62 	Gravelly loam, gravelly   sandy loam	SM, SC-SM, SC	A-2-4 	0-7 	2-25 	65-95 	65-90 	35-65 	15-35 	18-36 	3-17 
	62-80   	Gravelly sandy loam,   cobbly sandy loam,   fine sandy loam	CL-ML, ML,   SM, SC,   SC-SM	A-2-4, A-4     	0-7   	2-25     	65-95   	65-90     	35-75     	15-50     	16-26     	2-8   
1444414:	' 	İ	i	i I	i	i	i	i	i	i	i	i
Lupton	0-65 	Muck	PT 	A-8 	0 	0 	100	100 	100 	100 		NP
Cathro	   0-28	Muck	PT	  A-8	0	0	100	100	1 100	100	i	i
-	•	Loam, silty clay loam,	•	A-6, A-4 	0 	•	80-100 				20-40 	4-20 
	49-60 	Sandy loam, silty clay   loam, loam	SC, SC-SM,   CL, CL-ML	A-6, A-4 	0 	0-5 	80-100 	75-100 	60-100 	35-90 	20-40 	4-20 

Table 14.—Engineering Properties—Continued

   Map unit symbol	   Depth	USDA texture	Class	ification	Fragi	ments	Pe		ge pass	_	  Liquid	   Plas
and soil name	. <u>.</u>	i	i	<u> </u>	>10	3-10	i	ı	ī	ı		ticity
Ī	ĺ	İ	Unified	AASHTO	in	in	4	10	40	200	İ	index
1	In In	1	T	I	Pct	Pct	I	I	I	I	Pct	I
1444414:	 	1	1		 	 	1	 	 			1
Tawas	ı I 0-31	Muck	  PT	  A-8	, I 0	i I 0	1 100	1 100	1 100	1 100	i	i
	•	Fine sand, loamy fine	SC-SM,	A-2-4	i 0	, o		•	165-90		0-23	INP-6
i	I	sand, coarse sand,	SP-SM, SM	i	İ	İ	į	I	İ	İ	i	i
1	l	gravelly sand, loamy	1	1	I	I	I	I	I	I	1	1
1	l	sand, sand	!	1	!	!	!	l	ļ .	!	!	!
1444425:	l İ	1	1	1	l I	 	 	l I	 	 	1	1
Lerch	0-3	Muck	PT	A-8	i 0	I 0	100	100	100	100	i	i
i	3-7	Clay	CH	A-7			98-100		80-100	70-95	70-105	144-70
Ī	7-12	Clay, silty clay	CH	A-7	0		98-100					
!	12-29	Clay, silty clay	CH	A-7	0	0	98-100	95-100	80-100	70-95	51-101	29-70
!		Clay, silty clay	CH	A-7	J 0		98-100					
!	56-80	Stratified silt loam to		A-4, A-2-4,	1 0	1 0	98-100	95-100	65-100	35-90	16-36	2-17
l l			CL, ML	A-6		l	1		1	1	1	1
	 	to loamy fine sand	1		 	 		 	 	 	1	1
Herbster	   0-5		CL-ML, CL	A-7, A-6, A-4	,   0	,   0	  90-100	  85-100	  80-100	  65-90	22-41	6-18
!	5-10		CH, CL	A-7, A-6, A-4	J 0	0	90-100	85-100	75-100	55-95	26-52	9-32
!	l	silty clay loam, clay	I	I	l	l	1	l	I	I	1	I
l l		loam, silty clay	1	! _								
	10-13	Silty clay loam, clay,	CH, CL	A-7, A-6	I 0	I 0	90-100	85-100	180-100	65-95	34-65	17-43
	I I 13-28	silty clay, clay loam	  CH, CL	I IA-7	I I 0	I I 0	  90-100	   0E 100	   00 100	   70 0E	142 65	124 42
	•	Stratified silty clay	ICH, CL	IA-7	1 0		190-100				•	•
	20 33 	loam to clay to silty	I CII, CII	A	1	1	1 20 100	1 0 1 0 0	100 100	/ U   33 	1-20 09	123 44
i	' 	clay	i	i	i i	i	i	' 	i	i i	i	i
ı	33-55	Stratified silty clay	CH, CL	A-7	i 0	I 0	90-100	85-100	80-100	70-95	45-69	25-44
i	I	loam to clay to silty	i '	i	İ	İ	į	I	İ	İ	i	i
!	l	clay	I	1	I	I	I	I	I	I	1	I
!	55-80	Stratified very fine	ML, SC-SM,	A-6, A-4	0	J 0	190-100	85-100	60-95	35-75	16-32	2-13
1	l	sandy loam to silt	SC, SM	I	l	I	I	l	I	I	1	1
!	l	loam to loamy very	1	I	l	l	1	l	I	I	1	1
	l i	fine sand	1					  -			1	1
1444426:	! 	i	i	i	! 	İ	i	! 	! 	! 		i
Portwing	•	Silt loam	CL-ML, CL	A-6, A-4	0		90-100					
!	4-9	, ,, ,	CL	A-7, A-6, A-4	1 0	1 0	90-100	85-100	80-100	75-95	26-52	9-32
!		clay loam, silty clay	1	<u> </u>	<u> </u>		1	l	1	I	1	1
	9-32		CL, CH	A-7	I 0	I 0	90-100	85-100  -	180-100	65-95	42-65	24-43
ļ	l 20 51	clay loam	l cr. cr.		I ^	I ^	100 100	   0	I	I	140.65	104 40
	32-51 	Clay, clay loam, silty   clay loam	ICL, CH	A-7	0	0	90-100	ι 1 α2-ΤΛΟ	ι Ιαυ-ΤΟΟ	05-95 	42-65 	124-43
	I I 51-8∩	Clay loam  Stratified very fine	  SC-SM, SM,	  A-4, A-2-4	I I 0	I I 0	  90-100	I 185–1∩∩	ı 165-95	130-80	1 116-27	1 2-10
i 1	) 31 00 	sand to silt	CL-ML, ML	1	i	i	i	i	i	1	1	i

Table 14.—Engineering Properties—Continued

   Map unit symbol	Depth	   USDA texture	Class	ification	Frag	ments	P	ercenta sieve	ge pass	_	  Liquid	    Plas-
and soil name		I	ı	1	>10	3-10	Ι	ī	ı	ı	limit	ticity
1		I	Unified	AASHTO	in	in	4	10	40	200	1	index
I	In	T	I	1	Pct	Pct	I	1	I	Į .	Pct	I
1444426: I		1	 	1	 	!	I I	 	! !	I I	1	1
Herbster	0-5	  Silt loam	'  CL-ML, CL	A-7, A-6, A-4	, I 0	i 0	190-100	85-100	180-100	165-90	122-41	6-18
 		Silt loam, clay, loam,   silty clay loam, clay	. ,	A-7, A-6, A-4	•	•	•	85-100	•	•	•	•
i		loam, silty clay	i I	i	İ	i	i	i	i	i	i	i
 	10-13	Silty clay loam, clay,   silty clay, clay loam	CH, CL 	A-7, A-6 	0 	I 0	90-100 	85-100 	80-100 	65-95 	34-65 	17-43 
i	13-28		CH, CL	IA-7	i 0	i 0	190-100	85-100	80-100	170-95	143-65	124-43
 	28-33	Stratified silty clay   loam to clay to silty   clay	CH, CL 	A-7 	0 	0 	90-100   	85-100   	80-100   	70-95   	45-69 	25-44 
 	33-55	· <u>-</u>	,  CH, CL 	A-7 	,   0 	   0 	  90-100 	85-100   	80-100   	70-95   	45-69 	  25-44 
 	55-80	Stratified very fine	SC-SM, SM,   ML, SC 	A-6, A-4   	0   0   	0     	90-100       	85-100       	60-95       	35-75     	16-32     	2-13     
1444427:		1 1	! 		 	i	 	 	! 	! 	1	
Cornucopia	0-3	Silt loam	CL-ML, CL	A-6, A-4		0-5	97-100	95-100	80-100	70-90	22-41	6-18
-   	3-10	Very fine sandy loam,   silt loam, silty clay   loam, silty clay	SC-SM, CL	A-7, A-6, A-4	0 	0-5 	97-100 	95-100 	80-100 	55-95 	26-52 	9-32 
ļ	10-32		CL, CH	  A-7	, I 0	1 0-5	197-100	95-100	, 190-100	1 175-95	146-65	128-43
	32-45	=	CL, CH	IA-7				95-100				
İ			SC-SM, SM,	A-4, A-2-4	,			95-100				
į	50-72	Stratified very fine	SC-SM, SM,	A-4, A-2-4	0 	0-5	  97-100 	95-100 	65-95 	30-80 	  16-27 	2-10 
1444428: I		1	 	1	l I	1	 		 	 	1	
Cornucopia	0-3	  Silt loam	  CL-ML, CL	  A-6, A-4	, I 0	1 0-5	197-100	95-100	180-100	170-90	122-41	1 6-18
		Very fine sandy loam,   silt loam, silty clay	SC-SM, CL	A-7, A-6, A-4		•	•	95-100 	•	•	•	•
١		loam, silty clay		! _		1	I	I	I	I	1	1
I	10-32	· =	CL, CH	A-7	0	•	•	95-100	•	•	•	•
I	32-45	· =	CL, CH	A-7	0	•	•	95-100	•	•	•	•
 		sandy loam to silt loam		A-4, A-2-4 	i	İ	Ì	95-100 	ĺ	İ	İ	Ì
 	50-72	· _	SC-SM, SM,   CL-ML, ML	A-4, A-2-4 	l 0 I	0-5 	97-100 	95-100 	65-95 	30-80 	16-27 	2-10 

Table 14.-Engineering Properties-Continued

Map unit symbol	   Donth	USDA texture	Class	ification	Frag	ments	Pe	ercenta	ge pass number-	-	  Liquid	   Blace
	Depth	. OSDA texture	!	<del> </del>	1		<del>!</del>	sieve	number-	<del>-</del>		
and soil name	!		1 77 . 1 61 . 4		>10	3-10	•	1 10	1 40	1 000	limit	
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	4	10	40	200	<del></del>	index
	In	I	I	1	Pct	Pct	1	l	I	I	Pct	I
	I	1	1		I	1	I	l	I	1	1	1
1444431:	I	1	1		I	1	I	l	I	1	1	1
Croswell	•	Sand	SP-SM, SM	A-3, A-2-4	1 0	1 0	80-100		•	•	•	•
	1-7	Sand, loamy sand	SC-SM,	A-3, A-2-4	1 0	1 0	90-100	75-100	35-75	5-30	0-26	NP-6
	I	1	SP-SM, SM		I	1	I	l			I	1
	7-16	Sand, loamy sand	SC-SM,	A-3, A-2-4	1 0	1 0	90-100	75-100	35-75	5-30	0-24	NP-6
	I	1	SP-SM, SM	1	I	1	1	l	1	1	1	1
	16-39	Sand, loamy sand	SC-SM,	A-3, A-2-4	1 0	0	90-100	75-100	35-75	5-30	0-14	NP
	I	1	SP-SM, SM		I	1	1	l	1	1	1	1
	39-60	Sand	SP-SM, SM	A-3, A-2-4	1 0	0	90-100	75-100	35-70	5-15	0-14	NP
	I	1	1		I	1	I	l	1	1	1	1
1444432:	I	1	1		I	1	I	l	1	1	1	1
Gogebic	0-1	Slightly decomposed	PT	A-8	1 0	0	100	100	100	100		
	I	plant material	1	1	1	1	I	l	I	1	1	1
	1-5	Fine sandy loam	ML, SC-SM,	A-4	0-15	2-25	90-100	75-93	50-85	30-55	20-25	3-7
	I	1	SM, CL-ML	1	I	1	I	I	I	I	1	1
i !	J 5-7	Fine sandy loam,	SC-SM, SM,	A-4	0-15	2-25	85-100	75-93	35-85	20-55	20-25	3-7
	I	gravelly fine sandy	CL-ML, ML	1	1	1	1	I	I	1	1	1
	İ	lloam	i	İ	i	i	İ	İ	i	İ	İ	İ
	7-17	Fine sandy loam,	SC-SM, SM,	A-4	i 0-15	1 2-25	185-100	75-93	35-85	120-55	120-25	3-7
	i İ	gravelly fine sandy	CL-ML, ML	i	i	i	i	I	i	i	i	i
	i i	loam, cobbly sandy loam		i	i	i	i	i i	i	i	i	i
	I 17-26	Gravelly fine sandy	ML, SC-SM,	A-4, A-2-4	I 0-15	I 2-25	85-100	I 75-93	125-85	15-55	120-25	I 3-7
	i	loam, cobbly fine	SM, CL-ML	i ′	i	i	i	i	i	i	i	i
	i	sandy loam, sandy loam		i	i	i	i	I	i	i	i	i
	I 26-36	Sandy loam, fine sandy	CL, SC-SM	  A-2-4, A-4	i 0-15	I 2-30	90-100	I 75-93	125-85	15-55	125-40	110-20
	,	loam, cobbly loamy	1	1	i	i	i	1	i	i	i	i
	i i	sand, gravelly sandy	i	i	i	i	i	' I	i	i	i	i
	i i	l loam	i	i	i	i	i	' I	i	i	i	i
	I 36-53	Gravelly sandy loam,	SC-SM, CL	  A-2-4, A-4	i 0-15	1 2-30	90-100	75–93	125-85	115-55	125-40	110-20
	1	cobbly sandy loam,	1	1	0 =0	- 00	1		1	1	1	1
	i	fine sandy loam	i	i	i	i	i	' 	i	i	i	i
	I 53-71	Fine sandy loam, cobbly	ISC. SC-SM	  A-2-4, A-4	i 0-15	1 2-30	65-100	155-93	125-85	115-55	125-40	110-20
	1	sandy loam, very	1	1	0 =0	- 00	1	1	1	1	1	1
	i	gravelly sandy loam,	i	i	i	i	i	' 	i	i	i	i
	I	gravelly sandy loam	i	i	i	i	i	i I	i	i	i	i
	I 71-80	Fine sandy loam,	SC-SM, SC,	A-2-4, A-4	I 0-15	1 2-30	65-100	55–93	115-85	115-55	120-30	4-11
	, , <u>,</u> 50	gravelly fine sandy	CL-ML		1 2 23	1 200	1	1	1	1	1	1
	' 	loam, very gravelly	1	i	i	i	i	' 	i	i	i	<u> </u>
	' 	sandy loam, cobbly	i	i	i	i	i	' 	i	i	i	<u> </u>
	! !	sandy loam	1	! !			1	! !	<u> </u>		1	
	:	1 Sandy Loam		-	:	:	:	:	!	!	!	!

Table 14.—Engineering Properties—Continued

Map unit symbol	   Depth	USDA texture	Classi	fication	Frag	ments	P	ercenta sieve i	ge pass number-	-	  Liquid	   Plas-
and soil name	l	I	I	1	>10	3-10	1	I	I	1	limit	ticity
	<u> </u>	1	Unified	AASHTO	in	in	4	10	40	200	<u> </u>	lindex
	I In	1	1		Pct	Pct	1	l I	 	1	Pct	1
1444435:	! 	 	i I	, 		i	İ	İ	i I	i	i	İ
Iosco	I 0-7	Loamy sand	SM	A-2-4, A-1-b	0	0-7	90-100	80-100	45-75	15-30	18-35	2-10
	7-9	Loamy sand, sand, loamy	SC-SM,	A-3, A-2-4,	0	0-7	90-100	80-100	40-80	5-45	0-28	NP-10
	l	•	. ,	A-1-b		1	1	I	I	1	1	1
	9-11	Loamy sand, sand, loamy		A-1-b, A-3,	0	0-7	90-100	80-100	40-95	5-45	0-28	NP-10
	l	•	•	A-2-4		1		I	l	1	1	
	11-28	Sand, loamy sand, loamy		A-3, A-2-4,	0	0-7	90-100	80-100	40-95	5-45	0-28	NP-10
	I	•	•	A-1-b		1		I	l	1	1	
	28-34	Sand, loamy sand, loamy		A-3, A-2-4,	0	0-7	90-100	80-100	40-95	5-45	0-28	NP-10
		•	•	A-1-b		!		<u> </u>	<u> </u>			
	34-40			A-7, A-6, A-2	0	0-11	180-100	60-100	35-95	20-90	29-46	12-25
	!	loam, sandy clay loam,	!	!		!	!	!	!	!		!
	!	loam, gravelly sandy	!	!		!	!	!	!	!	!	!
	l 40 C0	loam	100.0% 00.07	1 7 7 7 7 6	•	1 0 11	100 100	I CO 100	125 05	100 00	106.46	110 05
	40-60		ISC-SM, SC, CL	A-2, A-7, A-6	0	1 0-11	180-100	100-100	35-95	120-90	26-46	110-25
	 	loam, loam, fine sandy	1	!		!	!	!	!	!		!
	 	loam, gravelly sandy   loam	1	! !		1	1	! !	! !	!	1	!
	! !	IOani	1	1		!		!	! !	!		
1444457:	! 	1	i I			i	<u> </u>	! 	! 	i	i	<u> </u>
Redrim	0-1	Moderately decomposed	PT	A-8	0	j 0	100	100	100	100	i	NP
	l	plant material	İ	İ		İ	Ì	İ	İ	İ	İ	Ì
	1-3	Highly decomposed plant	PT	A-8	0	0	100	100	100	100		NP
	l	material	I	1		1	1	I	I	I	1	1
	3-11	Very cobbly sand	SP-SM,	A-1-a	0-15	15-55	10-95	5-90	2-65	0-15	0-14	NP
	l	I	GP-GM, SP,	1		1	1	I	l	1	1	1
	l		GP, SM	1		1	1	I	I	1	1	1
	11-18	Very cobbly loamy sand,	SP, SP-SM,	A-1-a	0-15	15-55	10-95	5-90	2-70	0-25	0-19	NP-2
	l		SM, GP,	I		1		I	I	1	1	
	l		GP-GM	1		1	I	I	l	I	1	I
		extremely cobbly sand	!	!		!	!	!	!	!		!
	18-80	Unweathered bedrock				!	!	!				!
1444459:	l	1	!	!		!	!	!	!	!	!	!
1444459: Zeba		 	1074	1	•	1 0 20	105 100	   75 100	1 40 70	100 40	100 25	1 0 10
Zeba	•	Sandy loam  Sandy loam, cobbly fine		A-2-4, A-4    A-4, A-2-4,	0		85-100  85-100					2-10
	<u>2</u> -5	sandy loam, loamy sand		A-4, A-2-4,     A-1-b	U	1 0-30	102-100	1/2-100	133-63	113-33	1 0-25	INP-/
	I I 5_13	Sandy loam, loamy sand  Sandy loam, cobbly fine	•	A-1-D    A-4, A-2-4,	0	1 0-30	1 185-100	I 175-100	I I 40-85	I 115-55	1 0-23	IND-6
	1 3 13	sandy loam, fine sandy		A-1-b	U	1 0 30	102 100	1/3 100	1 40 03	1 2 33	1 0 23	INE
	! !	loam, cobbly sandy loam	•	1 1 1		1	<u> </u>	! !	! !		<u> </u>	<u> </u>
	ı I 13-21	Sandy loam, fine sandy		  A-4, A-2-4,	0	0-15	185-100	175-100	140-85	115-55	116-27	1 2-10
	, I			A-1-b	J	1	1	,	, -0 00 I	1	, _ <i></i>	. – ±0 I
	I 21-33	Sandy loam, fine sandy	•	A-4, A-2-4,	0	I 0-15	85-100	75-100	I 35-85	15-55	115-25	1-7
	<b>-</b>			A-1-b	-	= <b>-</b>	1	7 <b>0</b> I	,	<b>.</b>	i	. = . I
	33-80	Unweathered bedrock	·	i		i	i			· 	i	i
		·	·			-	-		-			-

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	USDA texture	Classi	ficat	ion	Frag	ments	Pe	ercenta	ge pass	-	  Liquid	   Dlac-
and soil name	i nebru	1 OSDA CEXCUTE	<u> </u>			1 >10	I 3-10	<del>'</del>	PTEAG 1	i i i i i i i i i i i i i i i i i i i			•
and soll name	! !	1	   Unified	!	AASHTO	>10   in	3-10   in	I I 4	   10	I I 40	I I 200	limit	ticity  index
	<u>!                                      </u>	<del>!</del>	· ourred	<u> </u>	AASHIO		<u> </u>	<del>! 4</del>	. 10	1 40	. 200		Imaex
	I In	!	1	!		Pct	Pct	!				Pct	
1444460	!	!	!	!		!	!	!	!	!	!	!	!
1444460:	1	101:-1:1		1 0		1	1	1 100	1 100	1 100	1 100	!	!
Abbaye	0-2	Slightly decomposed	PT	A-8		1 0	1 0	100	100	100	100		
	1 2 4	plant material	104 00 04	1 7 4	7 0 4	1 0	I I 0-7	105 100	   75 100	145 70	105 40	I I 0-25	1 2 7
		Sandy loam  Loamy sand, loamy fine	SM, SC-SM  SM, SC-SM		A-2-4 A-2-4	1 0		185-100	•	•	•	0-25	•
	1 4-13	sand, fine sandy loam,		A-4,	A-2-4	1 0	1 0-7	102-100	1/2-100	140-65	113-33	1 0-20	INE-2
	! !	sandy loam	1	!		1	1	!	! !	1			1
	I I 13-25	Sandy loam, fine sandy	ISM SC-SM SC	   121 – 41	A-2-4	1 0	1 0-7	185-100	1 175-100	I I 45-85	125-55	117-28	1 2-10
	13 23 	loam	I	1 4,	n 2 4	1	1 0 7	1	/3 ±00	1 43 03	123 33	1 20	1 2 10
	l 25-32	Sandy loam, loamy sand,	ISC-SM. SC	IA-4.	A-2-4	i 0	1 0-7	185-100	175-100	140-85	115-55	118-30	1 4-12
	, _0 0_ I	fine sandy loam	1	1,		i		1	1	1	1	1	i
	I 32-80	Unweathered bedrock	i	i		i	i	i	i		i	i	i
	İ	1	i	i		i	i	i	i	i	i	i	i
Lapoin	0-1	Highly decomposed plant	PT	A-8		0	0	100	100	100	100	i	i
-	İ	material	İ	İ		i	i	İ	İ	İ	İ	İ	İ
i	1-4	Loam	CL-ML, CL	A-4		0-2	0-5	95-100	90-100	75-95	55-75	26-48	7-13
	4-7	Loam, sandy loam, sandy	SC, CL	A-6,	A-4	0-2	0-5	95-100	90-100	55-95	25-75	24-43	6-17
	I	clay loam, fine sandy	1	I		1	1	1	I	I	1	1	I
	l	loam	1	I		1	1	1	I	1	I	1	I
	7-19	Clay, loam, clay loam,	CL, CH	A-7,	A-6	0-2	0-5	95-100	90-100	75-100	55-95	37-61	18-37
	l	silty clay loam	1	I		I		1	I	1	1	1	1
	19-34	Clay, clay loam, silty	CL, CH	A-7		0-2	0-5	95-100	90-100	80-100	65-95	45-69	25-44
	l	clay, silty clay loam	1	I		1	1	1	I	1	1	1	1
	34-39		SC-SM, SC	A-4,	A-2	0-2	0-5	95-100	90-100	55-85	25-55	16-27	2-10
		loam	!	!			!	!	!	!	!	!	ļ
	39-80	Unweathered bedrock	!	!					!		!		!
1444461:	!	!	!	!		1	1	!	!	1	!		1
	1 0 2	  Slightly decomposed	I IPT	I IA-8		1 0	1 0	I I 100	I I 100	I I 100	I I 100	!	l INP
Abbaye	1 0-2	plant material	PI	I W-0		1 0	1 0	1 100	1 100	1 100	1 100		I NP
	I I 2-1	Sandy loam	SM, SC-SM	I I 23 — /I	A-2-4	1 0	1 0-7	185-100	I 175-100	I I 45-70	125-40	   0-25	1 2-7
		Loamy sand, loamy fine			A-2-4	1 0						0-28	
	1 7 13	sand, fine sandy loam,	I SELL	1 4,	n 2 4	1	1 0 7	1	/3 ±00	1 40 03	1	1 0 20	1
	! !	sandy loam	<u> </u>	i .		i	i	i		i	i	i	i
	I 13-25	Sandy loam, fine sandy	ISM, SC-SM, SC	A-4	A-2-4	i 0	1 0-7	185-100	75-100	45-85	125-55	117-28	2-10
	, _0 _0 I	l loam	1	1,		i		1	1	1	1	1	
	25-32	Sandy loam, loamy sand,	SC-SM, SC	A-4.	A-2-4	i o	0-7	85-100	75-100	40-85	15-55	18-30	4-12
	 I	fine sandy loam	1	/	=	i	i	1	=- <b>v</b>	 I		1	 I
	32-80	Unweathered bedrock	i	i		i	i	· 			· 	i	
		1	i	i		i	i	i	i	i	i	i	i

Table 14.-Engineering Properties-Continued

2-5   5-13   5-13   .3-21   .21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy loam, fine sandy	CL-ML, ML  SC-SM, SM,   CL-ML, ML    SC-SM, SM,	AASHTO     A-2-4, A-4   A-4, A-2-4,   A-1-b   A-4, A-2-4,   A-1-b	in   Pct	0-30 	4          85-100	   10          75-100	        40-70	200   1   1   1   20-40	Liquid   limit     Pct     20-35   0-25	ticity  index           2-10
0-2 2-5 5-13 5-13 21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	 	  A-2-4, A-4  A-4, A-2-4,  A-1-b  A-4, A-2-4,  A-1-b	in   Pct	in   Pct       0-30   0-30	4          85-100	         75-100	        40-70	      20-40	Pct        20-35	index           2-10
0-2 2-5 5-13 5-13 21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	 	  A-2-4, A-4  A-4, A-2-4,  A-1-b  A-4, A-2-4,  A-1-b	Pct       0   0	Pct         0-30   0-30	        85-100	         75-100	        40-70	      20-40	Pct        20-35	       2-10
0-2 2-5 5-13 5-13 21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	SC-SM, SM,   CL-ML, ML   SC-SM, SM,   CL-ML, ML     SC-SM, SM,	A-4, A-2-4,   A-1-b  A-4, A-2-4,   A-1-b		0-30   0-30					      20-35	
2-5   5-13   5-13   .3-21   .21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	SC-SM, SM,   CL-ML, ML   SC-SM, SM,   CL-ML, ML     SC-SM, SM,	A-4, A-2-4,   A-1-b  A-4, A-2-4,   A-1-b	i 0 I	0-30 						
2-5   5-13   5-13   .3-21   .21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	SC-SM, SM,   CL-ML, ML   SC-SM, SM,   CL-ML, ML     SC-SM, SM,	A-4, A-2-4,   A-1-b  A-4, A-2-4,   A-1-b	i 0 I	0-30 						
2-5   5-13   5-13   .3-21   .21-33	Sandy loam, cobbly fine sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	SC-SM, SM,   CL-ML, ML   SC-SM, SM,   CL-ML, ML     SC-SM, SM,	A-4, A-2-4,   A-1-b  A-4, A-2-4,   A-1-b	i 0 I	0-30 						
5-13   	sandy loam, loamy sand Sandy loam, cobbly fine sandy loam, fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	CL-ML, ML  SC-SM, SM,   CL-ML, ML    SC-SM, SM,	A-1-b  A-4, A-2-4,   A-1-b	0     0	ĺ	85-100 	75-100 	35-85	15-55	0-25	IND_7
5-13   	Sandy loam, cobbly fine sandy loam, fine sandy loam, sandy loam Sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	SC-SM, SM,   CL-ML, ML    SC-SM, SM,	A-4, A-2-4,   A-1-b	l I 0	I	I	I				IME /
: 	sandy loam, fine sandy loam, cobbly sandy loam Sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	CL-ML, ML	A-1-b	0				I		1	1
.3-21   	loam, cobbly sandy loam Sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	  SC-SM, SM,	i		0-30	85-100	75-100	40-85	15-55	0-23	NP-6
3-21   	Sandy loam, fine sandy loam, loamy sand Sandy loam, fine sandy	SC-SM, SM,		l	I	I	I	I	1	1	1
! !1-33   !	loam, loamy sand Sandy loam, fine sandy			I	I	I	I	I	1	1	1
21-33   	Sandy loam, fine sandy		A-4, A-2-4,	0	0-15	85-100	75-100	40-85	15-55	16-27	2-10
1		CL-ML, ML	A-1-b	I	I	I	I	I	1	1	1
		SC-SM, SM,	A-4, A-2-4,	0	0-15	85-100	75-100	35-85	15-55	15-25	1-7
3-80	loam, loamy sand	CL-ML, ML	A-1-b	I	I	I	I	I	1	1	1
1	Unweathered bedrock										
		I	1	I	I	I	l	I	1	1	1
1		I	I	I	I		l	I	1	1	1
0-3	Sand	SP-SM, SM	A-3, A-2-4,	0	0	80-100	75-100	40-70	5-15	0-25	NP-4
1		I	A-1-b	I	I		l	I	1	1	1
3-4	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-4,	0	0	80-100	75-100	40-80	5-45	0-24	NP-6
1	fine sand, fine sand	I	A-1-b, A-2-4	I	I		l	I	1	1	1
4-23	Sand, loamy sand, fine	SP-SM, SM	A-3, A-4,	0	1 0	80-100	75-100	40-80	5-45	0-29	NP-6
1	sand, loamy fine sand	l .	A-1-b, A-2-4	I	I	I	I	I	1	1	1
23-32	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	0	1 0	80-100	75-100	40-80	5-45	0-23	NP-6
1	sand, loamy fine sand	I	A-1-b, A-2-4	I	I		l	I	1	1	1
32-40	Sand, fine sand	SP-SM, SM	A-3, A-2-4,	0	1 0	80-100	75-100	40-80	5-35	0-19	NP-2
1		I	A-1-b	I	I		l	I	1	1	1
10-48	Stratified fine sand to	SP-SM, SM	A-3, A-2-4,	0	0	80-100	75-100	40-80	5-35	0-19	NP-2
1	very fine sand	I	A-1-b	I	I		l	I	1	1	1
18-60	Stratified very fine	SC, SC-SM,	A-6, A-4	0	0	95-100	90-100	75-95	45-85	20-32	6-13
1	sandy loam to silt loam	CL, CL-ML	I	I	I		l	I	1	1	1
1		I	I	I	I		l	I	1	1	1
0-1	Sand	SP-SM, SM	A-1-b, A-2-4	0	0	80-100	75-100	30-75	10-35	0-29	NP-6
1-7	Sand, loamy sand	SP-SM, SM,	SP A-3, A-2-4,	0	0	90-100	75-100	40-75	3-30	0-26	NP-6
1		I	A-1-b	I	I		l	I	1	1	1
7-16	Sand, loamy sand	SP-SM, SP,	SM A-3, A-2-4,	0	0	90-100	75-100	40-75	3-30	0-24	NP-6
1		l ·	A-1-b	I	I	I	l	I	1	1	1
6-39	Sand, loamy sand	SP-SM, SP,	SM A-3, A-2-4,	0	0	90-100	75-100	40-75	3-30	0-23	NP-6
i	<u>-</u>	l ·	A-1-b	I	I	I	l	I	1	1	1
39-60 i	Sand	SP-SM, SP,	SM A-3, A-2-4,	0	0	90-100	75-100	40-70	I 3-15	I 0-19	NP-2
i	i i	1	A-1-b								
3- 4- 23- 32- 10- 18- 7- 16-	-4	-4  Sand, loamy sand, loamy   fine sand, fine sand -23  Sand, loamy sand, fine   sand, loamy fine sand -32  Sand, fine sand, loamy   sand, loamy fine sand -40  Sand, fine sand -48  Stratified fine sand to   very fine sand -60  Stratified very fine   sandy loam to silt loam   -1  Sand -7  Sand, loamy sand   -16  Sand, loamy sand   -39  Sand, loamy sand	-4  Sand, loamy sand, loamy  SP-SM, SM   fine sand, fine sand   -23  Sand, loamy sand, fine  SP-SM, SM   sand, loamy fine sand   -32  Sand, fine sand, loamy  SP-SM, SM   sand, loamy fine sand   -40  Sand, fine sand  SP-SM, SM   -48  Stratified fine sand to  SP-SM, SM   very fine sand   -60  Stratified very fine  SC, SC-SM,   sandy loam to silt loam  CL, CL-ML   -1  Sand  SP-SM, SM   -7  Sand, loamy sand  SP-SM, SM, SM   -16  Sand, loamy sand  SP-SM, SP, SM   -39  Sand, loamy sand  SP-SM, SP, SM   -39  Sand, loamy sand  SP-SM, SP, SM	A-1-b	A-1-b	A-1-b					

Table 14.-Engineering Properties-Continued

			!	Clas	SIII	cation	Frag	ments	. Po		ge pass	-		
Map unit symbol	Depth	USDA texture	!				<u> </u>		<del>!</del>	sieve	number-	<del>-</del>	Liquid	
and soil name	!		17		- !	3 3 CUITO	>10	3-10	•	1 10	1 40	1 200	limit	
	<u>!                                      </u>	<u>!</u>	Uni	fied		AASHTO	in	in	1 4	1 10	1 40	200		lindex
	l <u>In</u>	!	!		!		Pct	Pct	!	I	!	I	Pct	!
1444477	!		!		!		!	!	!	!	!	!	!	!
1444477: Ashwabay	I I 0-4	  Loamy sand	I CD CM	CM	17	-2, A-1	1 0	1 0	  90-100	100 100	120 75	110 25	1 0 14	INTO 1
ASHWaDay	•	Sand, fine sand, loamy	SP-SM,			-2, A-1 -2, A-1	1 0	1 0	190-100	•	•	•	•	•
	1 73	sand	I SE SM,	SH	1-	. Z, A I	1	1	1 20 100	100 100	<del>1</del> 0 00	1 3 33	1 0 19	I I
	I 5-12	•	SP-SM,	SM	1.7	-3, A-2, A-1	i 0	i 0	90-100	180-100	1 140-80	I 5-45	0-19	INP-1
	, I	sand, loamy fine sand	i,		i	, ,	i	i			, I	1	i	i -
	12-32	·	SP-SM,	SM	į z	-3, A-2, A-1	0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	l	sand	İ		ĺ		İ	İ	İ	İ	ĺ	İ	İ	İ
	32-45	Sand, fine sand	SP-SM,	SM	7	-3, A-2, A-1	1 0	0	90-100	80-100	40-80	5-35	0-14	NP
	45-62	Clay, clay loam, silty	CL, CH		7	7	0	0	90-100	80-100	70-100	55-95	45-69	25-44
	•	clay	1		- 1		1	1	1	I	I	I	1	I
	62-80	Stratified clay to silt	[CL, CH		7	7	1 0	1 0	90-100	80-100	40-100	5-95	0-69	NP-44
	!	to sand	!		!		!	!	!	!	!	!	!	!
1444470	!		!		!		!	!	!	!	!	!	!	!
1444478: Cublake	I I 0-3	  Sand	SP-SM,	CM	17	-3, A-2-4,	I I 0	1 0	  80-100	175 100	I I 4 0 - 7 0	   E 1E	1 0 25	INTO 4
Cubrake	I 0-3	Isand	ISP-SM,	SM		A-1-b	1 0	1 0	190-100	1/2-100	40 – 70 	1 2-12	1 0-25	INP-4
	ı I 3–4	Sand, loamy sand, loamy	ISP-SM	SM		-3, A-4,	1 0	1 0	180-100	1 175-100	1 140-80	I I 5-45	0-24	IND-6
		fine sand, fine sand	1	011		A-1-b, A-2-4	•	i	1	1	1	1	1	1
		•	SP-SM,	SM		-3, A-4,	i 0	i 0	80-100	75-100	40-80	5-45	0-29	NP-6
		sand, loamy fine sand	į ,		i	A-1-b, A-2-4	İ	i	İ	i	İ	i	i	i
	23-32	Sand, fine sand, loamy	SP-SM,	SM	7	-3, A-4,	1 0	1 0	80-100	75-100	40-80	5-45	0-23	NP-6
	l	sand, loamy fine sand	1		- 1	A-1-b, A-2-4	1	1	1	I	I	I	1	1
	32-40	Sand, fine sand	SP-SM,	SM		-3, A-2-4,	1 0	0	80-100	75-100	40-80	5-35	0-19	NP-2
	l	I	1			A-1-b	1	1	1	I	I	I	1	I
		Stratified fine sand to	SP-SM,	SM		-3, A-2-4,	1 0	1 0	180-100	75-100	40-80	5-35	0-19	NP-2
		very fine sand		~		A-1-b	1	1				1 45 05		
	48-60	· -	ISC, SC		Į E	-6, A-4	1 0	1 0	95-100	190-100	75-95	145-85	120-32	6-13
	 	sandy loam to silt loam	I CL, C	r-Mr	-		!	1	1	1	! !	 	1	!
Croswell	ı I 0–1	  Sand	SP-SM,	SM	l I Z	-1-b, A-2-4	1 0	1 0	  80-100	1 175-100	ı 130-75	1 110-35	1 0-29	IND-6
CIOSWEII	•	Sand, loamy sand	. ,			-3, A-2-4,	1 0	•	190-100	•	•	•	•	•
	, I		1	,		A-1-b	i	i	1	1	1	1	1	1
	7-16	Sand, loamy sand	SP-SM,	SP,	SM   Z	-3, A-2-4,	0	0	90-100	75-100	40-75	3-30	0-24	NP-6
	I	I	I É	•		A-1-b	I	1	I	I	I	I	1	I
	16-39	Sand, loamy sand	SP-SM,	SP,	SM Z	-3, A-2-4,	0	0	90-100	75-100	40-75	3-30	0-23	NP-6
	I	I	1		- 1	A-1-b	I	1	I	I	I	I	1	I
	39-60	Sand	SP-SM,	SP,		-3, A-2-4,	1 0	0	90-100	75-100	40-70	3-15	0-19	NP-2
	I	1	1		- 1	A-1-b	1	1	1	I	I	I	1	1

Table 14.-Engineering Properties-Continued

Map unit symbol	Depth	USDA texture	Classi	fication	Frag	ments	P	ercenta sieve	ge pass: number-	_	  Liquid	   Plas-
and soil name		I	1	1	>10	3-10	1	I	I	I	limit	ticity
		1	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	1	1	1	Pct	Pct	I	I	I	I	Pct	I
   1444478:		1			 	1					1	
Ashwabay	0-4	  Loamy sand	SP-SM, SM	  A-2, A-1	l I 0	1 0	  90-100	I I 20_100	1 130-75	I I 1 1 – 3 5	0-14	INTD_1
Asiiwabay		Sand, fine sand, loamy		A-2, A-1	1 0		•	•	•	•	0-19	•
	4 3	sand	l SM, SM	1		i	1	1	1 40 00	3 33 	1 0 13	1
	5-12	• • • •	SP-SM, SM	A-3, A-2, A-1	0	i 0	90-100	80-100	40-80	5-45	0-19	NP-1
i		sand, loamy fine sand	į ,	i i	İ	į	į	İ	İ	İ	i	į
1	12-32	Sand, loamy sand, fine	SP-SM, SM	A-3, A-2, A-1	0	0	90-100	80-100	40-80	5-35	0-19	NP-1
I		sand	1	1	l	1	I	I	I	I	1	1
	32-45	Sand, fine sand	SP-SM, SM	A-3, A-2, A-1	0						0-14	
l		Clay, clay loam, silty	CL, CH	A-7	0	1 0	90-100	80-100	70-100	55-95	45-69	25-44
		clay		!		!				!		
	62-80	Stratified clay to silt	ICL, CH	A-7	0	1 0	90-100	180-100	140-100	5-95	0-69	NP-44
		to sand	l i	!	l		1	! !	1	! !	!	1
1444479:		1	 		 	 	! !	! !	! !	! !	<u> </u>	 
Morganlake	0-4	Loamy sand	SM	  A-2-4	1 0	1 0-7	  95-100	1 190-100	1 150-75	1  15-30	1 0-33	INP-10
		Loamy sand, sand, loamy	•	A-3, A-4,	0		95-100			•	•	•
i		fine sand, fine sand		A-1-b, A-2-4	İ	į	į	İ	İ	İ	i	į
1	8-26	Loamy fine sand, sand,	SP-SM, SM,	A-3, A-4,	0	0-7	95-100	90-100	45-80	5-45	0-25	NP-7
1		loamy sand, fine sand	SC-SM	A-1-b, A-2-4		1	I	I	I	I	1	I
1	26-31	Loamy fine sand, sand,	SP-SM, SM,	A-3, A-4,	0	0-7	95-100	90-100	45-80	5-45	0-22	NP-4
l			SC-SM	A-1-b, A-2-4		1	1	Ι .	1	l	1	1
	31-40			A-2, A-6, A-7	0	0-7	180-95	75-95	40-95	25-90	29-46	12-25
		loam, loam, sandy clay		!			!	!	!	!	!	!
		loam, sandy loam, silt   loam	I I	!	 		1	I	1	!	!	!
	40-60	•	ISC-SM SC CT.	  A-7, A-6, A-2	I I 0	I I 0-7	1 180-95	I 175-95	I I 4 0 = 95	1 125-90	  22-42	I I 6-21
	40 00	loam, loam, sandy clay				1 0 7	1	/3   33 	1 40 33	123 JU	1 22 32	1 0 21
		loam, sandy loam	İ	i	i	i	i	i	i	i	i	i
i		i	İ	İ	İ	į	į	İ	İ	İ	i	į
1444480:		1	1	1		1	I	I	I	I	1	I
Morganlake		Loamy sand	SM	A-2-4	0	•	•	•	•	•	0-33	
I		Loamy sand, sand, loamy	SM, SC-SM	A-3, A-4,	0	0-7	95-100	90-100	45-80	5-45	0-26	NP-4
		fine sand, fine sand		A-1-b, A-2-4								
	8-26		SP-SM, SM,	A-3, A-4,	0	0-7	95-100	90-100	45-80	5-45	0-25	NP-7
	26 21		SC-SM  SP-SM, SM,	A-1-b, A-2-4   A-3, A-4,	l I 0	I I 0-7	  95-100	I 100 100	145 00	I I 5-45	I I 0-22	INTO 4
	20-31	loamy sand	I SC-SM	A-1-b, A-2-4		1 0-7	192-100	1	142-00	   2- <del>4</del> 2	1 0-22	INF-4
	31-40	· =		A-2, A-6, A-7		l 0-7	1 180-95	ı 175-95	1 140-95	ı 125-90	129-46	  12-25
i		loam, loam, sandy clay				 I	 		. <u></u>	 		<b></b>
i		loam, sandy loam, silt		İ		İ	İ	İ	İ	İ	İ	İ
i		loam	1	1	l	I	I	I	I	I	1	I
I	40-60	Silty clay loam, clay	SC-SM, SC, CL	A-7, A-6, A-2	0	0-7	80-95	75-95	40-95	25-90	22-42	6-21
1		loam, loam, sandy clay	1	1		I	I	I	I	I	1	I
		loam, sandy loam	1	1	1	1	1	1	1	I	1	1

Table 14.-Engineering Properties-Continued

Depth	USDA texture	1		ı		1	S10776 1	number-	_	I T.i mui d	Plas-
		<u> </u>		>10	I 3-10	<del> </del>	STEVE !	i i i i i i i i i i i i i i i i i i i			
	 	   Unified	   AASHTO	>10   in	3-10   in	I I 4	I I 10	I I 40	I I 200		ticity  index
<del>-</del>	<u> </u>	· onlined	, AASHIO	<u>'</u>	<u>'</u>	<u> </u>	1 10	1 40	1 200		Tindex
<u>In</u>	!		!	PCt	PCT	!	I	!		PCt	
	1	!	!	  -	!	1	1	1	1	!	1
0 0		 	13.0	. ^	I ^	1 100	1 100	1 100	1 100	!	!
		PT	A-8			1 100	1 100	1 100	1 100		
	· =	I CD CM CM	1 2 7 2 4		I 0 E	100 100	105 100	140 70	   E 1E	1 0 22	INTO 4
2-0	ı Sanu	ISE-SM, SM			1 0-2	190-100	102-100	140-70	1 2-12	1 0-22	INE-4
6-26	leand learns sand	ICM CD_CM	•	I 0	I I 0-5	100_100	105_100	I I 40-75	1 2-30	1 0-26	IND_7
0-20	I sand, Isany sand	ISM, SF-SM		1	I 0-3	190-100	102-100	140-75	1 2-20	1 0-20	INE-/
26-29	l  Cilty alay alay eilty	ICT. CH	•	. o		105_100	105_100	100_100	1 170-95	1/1-60	121_11
		I CII, CII	A   /	1		193 100	195 100	1 30 100	10 95 	141 03	121 33
		ICT. CH	1 12-7	I 0	, , 0	1 195–100	1 195-100	190-100	1 170-95	145-69	125-44
		1	1	i		1	1	1	1	1	1
		ICT. CH	  A-7	, I 0	i 0	1 195-100	1 195-100	1 190-100	170-95	141-69	121-44
		1	1	İ	İ	1	1	1	1	1	i
	0_0, _0	i	i	' 	i	i	i	i	i	i	i
0-3	Loamv fine sand	SM	  A-4, A-2-4	i 0	i 0	195-100	90-100	165-80	125-40	i 0-31	INP-6
		ISP-SM, SM		i 0	•	•	•	•	•	•	•
			. , ,	i	i	İ	İ	İ	i	i	i
		i	i '	I	İ	i	i	i	i	i	i
		SP-SM, SM	A-3, A-4,		0	95-100	90-100	45-80	5-40	0-23	NP-6
	· · · · · - · · · · ·	i '		I	İ	i	i	i	i	i	i
13-26	Sand, fine sand, loamy	SP-SM, SM	A-2-4,	0	0	95-100	90-100	45-80	5-40	0-23	NP-6
	fine sand, loamy sand		A-1-b, A-4,	l	I	I	I	I	I	1	1
	l	1	A-3	l	I	1	I	1	1	1	1
26-28	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	0	0	95-100	90-100	45-80	5-40	0-23	NP-6
	fine sand, loamy sand	1	A-1-b, A-2-4	l	l	1	1	1	1	1	1
		CH	A-7	0	J 0	100	98-100	90-100	75-95	49-69	29-44
34-60	Clay, silty clay	CH	A-7	0	1 0	100	98-100	90-100	75-95	49-69	29-44
	I	1	1	l	l	I	1	I	I	1	1
					•	•	•	•	•	•	•
	· · · · · - · · · · ·	SP-SM, SM	A-2, A-1	0	0	90-100	180-100	40-80	5-35	0-19	NP-1
	•								!		
	·	SP-SM, SM	[A-3, A-2, A-1	. 0	. 0	190-100	180-100	140-80	5-45	1 0-19	IND-T
	·			1	I ^	100 100	100 100	1 40 00	I - 25	1 0 10	1277 1
	· · · · · - · · · · · · · · · · · · · ·	SP-SM, SM	A-3, A-2, A-1	. 0	. 0	190-100	180-100	140-80	5-35	1 0-19	IND-T
	•	I CD CM CM	 	I 0	I 0	100 100	100 100	140 00	1 5 25	1 0 14	I ND
		ICE, CH	A - /	ı U	1 0	1 120-TOO	190-100	1 10-TOO	122-32	143-69	123-44
		ICT. CH	I I 2 – 7	I 0		100-100	180-100	140-100	I I 5-05	1 0-69	IND_//
	·	ICH, CH	A   /	ı <sup>0</sup>	1 0	1 20-T00	100-100	1 1-20-700	1 2-32 1	1 0-09	145-44
	l co sand	1		I I	! !	! !	1	! !	1	1	1
2 2 4 1 1 2 2 3 1 3 4	2-6 6-26 26-29 29-40 10-80 0-3 3-10 10-13 13-26 26-28 28-34 34-60 0-4 4-5 5-12 12-32 32-45 15-62	O-2   Moderately decomposed   plant material   2-6   Sand   6-26   Sand, loamy sand   26-29   Silty clay, clay, silty   clay loam   29-40   Silty clay, clay, silty   clay loam   10-80   Silty clay, clay, silty   clay loam   10-80   Silty clay, clay, silty   clay loam   10-81   Sand, loamy sand, loamy   fine sand, sandy loam,   fine sand, loamy   fine sand, loamy   fine sand, loamy sand   13-26   Sand, fine sand, loamy sand   13-26   Sand, fine sand, loamy   fine sand, loamy   fine sand, loamy sand   12-28   Sand, fine sand, loamy sand   12-31   Sand, fine sand, loamy   sand   12-32   Sand, fine sand, fine sand, loamy   sand   13-45   Sand, loamy sand, fine   sand, loamy sand   13-62   Sand, fine sand   Sand, fine sand   Sand, sand   San	O-2   Moderately decomposed   PT   plant material		0-2   Moderately decomposed   PT		0-2   Moderately decomposed   PT	0-2   Moderately decomposed   PT	0-2   Moderately decomposed   PT	0-2   Moderately decomposed   PT	0-2   Moderately decomposed   PT

Table 14.—Engineering Properties—Continued

	I	1	Class	ification	Frag	ments	l P		ge pass:	_	1	I
Map unit symbol	Depth	USDA texture	1		<u> </u>		<u> </u>	sieve	number-	<del>-</del>		Plas-
and soil name	I	I	1	I	•	3-10	•	1	1	l	•	ticity
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	4	10	40	200	<u>.                                    </u>	index
	In	I	1	1	Pct	Pct	1	1	I	l	Pct	1
	1	1	1	1	1	1	1	1	1	l	1	1
1444482:	I	1	1	I	1	1	1	1	1	l	1	1
Kellogg	0-2	Moderately decomposed	PT	A-8	0	1 0	100	100	100	100		
	I	plant material	1	I		1	1	1	1	l	1	1
	2-6	Sand	SP-SM, SM	A-3, A-2-4,	0	0-5	90-100	85-100	40-70	5-15	0-22	NP-4
	I	I	1	A-1-b		1	1	1	1	l	1	
	6-26	Sand, loamy sand	SM, SP-SM	A-3, A-2-4,	0	0-5	90-100	85-100	40-75	5-30	0-26	NP-7
	I	I	1	A-1-b		1	1	1	1	l	1	
	26-29	Silty clay, clay, silty	CL, CH	A-7	0	1 0	95-100	95-100	90-100	70-95	41-69	21-44
	I	clay loam	1	I		1	1	1	1	l	1	1
	29-40	Silty clay, clay, silty	CL, CH	A-7	0	0	95-100	95-100	90-100	70-95	45-69	25-44
	I	clay loam	1	I	1	1	1	1	I	l	1	1
	40-80	Silty clay, clay, silty	CL, CH	A-7	0	1 0	95-100	95-100	90-100	70-95	41-69	21-44
	I	clay loam	1	I	I	1	I	I	I	l	1	1
	1	I	1	1	1	1	1	1	1	Ι	1	1
Allendale	•	Loamy fine sand	SM	A-4, A-2-4	1 0	•	95-100	•		•	•	•
!	3-10	Sand, loamy sand, loamy		A-3, A-4,	0	0	95-100	90-100	45-85	5-40	0-28	NP-10
	!	fine sand, sandy loam,	1	A-1-b, A-2-4	1	!	!	1	!		!	1
		fine sandy loam	1	!	!	!			l			!
	10-13		SP-SM, SM	A-3, A-4,	1 0	0	95-100	90-100	45-80	5-40	0-23	NP-6
	!	fine sand, loamy sand	1	A-1-b, A-2-4		!			l	<u> </u>		!
	13-26	Sand, fine sand, loamy	SP-SM, SM	A-2-4,	1 0	1 0	195-100	90-100	45-80	5-40	0-23	NP-6
	!	fine sand, loamy sand	!	A-1-b, A-4,	!	!	!	!	!	!	!	!
				A-3	!	!						
	26-28	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	1 0	1 0	195-100	190-100	145-80	5-40	0-23	NP-6
		fine sand, loamy sand		A-1-b, A-2-4		1	1 100	100 100				1
		Clay, silty clay	CH	A-7	1 0	1 0	•	•	190-100	•	•	•
	34-60	Clay, silty clay	CH	A-7	1 0	1 0	100	1 1 A8 - T00	90-100	/5-95 	149-69	29-44
3 abreak ar-	1 0 4	I I come cond	I CD CM CM	1 7 7 1	1 ^	1 ^	100 100	100 100	120 75	110 25	1 0 14	INTO 1
Ashwabay		Loamy sand	SP-SM, SM	A-2, A-1	I 0	•	190-100	•		•	•	•
	1 4-5	Sand, fine sand, loamy   sand	SP-SM, SM	A-2, A-1	1 0	1 0	90-100	180-100	140-80	1 2-35	1 0-19	INP-I
	I E 10	Sand   Sand, fine	LCD CM CM	 	I I 0	1 0	100 100	100 100	140 00	I I 5-45	I I 0-19	INTO 1
	1 2-12	sand, loamy fine sand	SP-SM, SM	A-3, A-2, A-1		1 0	90-100	100-100	140-00	1 3-43	1 0-19	INP-T
	1 12-22	Sand, loamy line sand  Sand, loamy sand, fine	SP-SM, SM	  A-3, A-2, A-1	I I 0	1 0	  90-100	I 190_100	140-00	   5_25	I I 0_10	IND_1
	1 12-32	sand	ISP-SM, SM	A-3, A-2, A-1	1 0	1 0	190-100	100-100	140-00	1 2-35	1 0-19	INP-T
	1 32-45	Sand  Sand, fine sand	  SP-SM, SM	  A-3, A-2, A-1	I I 0	1 0	  90-100	180-100	140-80	I I 5-35	1 0-14	I NTD
		Clay, clay loam, silty	• •	A-3, A-2, A-1  A-7		•	190-100	•		•	•	•
	1 43-02	clay	ICH, CH	A ' /	1	1	190-100	100-100	1,0-100	I 22-32	1-25-09	123-44
	1 62-80	Clay  Stratified clay to silt	ICT. CH	  A-7	I I 0	1 0	  90-100	180-100	1 140-100	   5-05	1 0-60	INTD-//
	1 02-00	to sand	ICH, CH	A ' /	1	1	190-100	100-100	1 1-20-100	I 3-33	1 0-09	145-44
	1	i co sand			1	1	!	1	! !	! !	1	1
	I	1	1	1	1	1	I	1	I	ı	1	1

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	   USDA texture	Classi	fication	Frag	ments	l P	ercenta sieve	ge pass number-	_	  Liquid	    Plas-
and soil name	i	İ	1	1	>10	I 3-10	i i			1	limit	ticity
	i	i	Unified	AASHTO	in	in	4	10	40	200	i	index
	l <u>In</u>	<u> </u>	i	Ī	Pct	Pct	ī	i i	i	Ī	Pct	ī
	I	I	1	1	1	1	1	I	I	I	1	1
1444486:	!	1	!	!	1	!			!	I		1
Sedgwick		Sandy loam	SM, SC-SM, SC		1 0	0-3	80-100					
	5-8 	Loamy sand, fine sandy   loam, sandy loam,	SP-SM, SM, SC	C A-4, A-2-4,   A-1-b	0 	0-3 	80-100 	75-98 	30-90 	10-50 	0-28 	NP-10
	I	loamy fine sand	1	1	1	1	1	1		I	1	1
	8-16 	Sandy loam, fine sandy   loam	SC-SM, SC	A-4, A-2-4 	I 0	0-3 	80-100 	75-98 	45-90 	20-50 	21-33 	4-12 
	16-19	Clay, silty clay loam,   sandy loam, clay loam	CL, CH	A-7, A-6	0	0-3	98-100	95-98 	60-95 	50-85 	31-78	12-51
	I 19-53	Clay, clay loam, silty	CL, CH	  A-7	i 0	0-3	98-100	195-98	185-95	175-85	141-78	121-51
	1	clay loam, silty clay	1	1	i	1	1	1	1	1	1	1
	53-80 	Silty clay, silty clay   loam, clay, clay loam	CL, CH	A-7 	0	0-3	98-100	95-98 	85-95 	75-95 	41-78 	  21-51 
M	1 0 0	I Time and I am	1014 00 014 00	1 7 4	1 0	1	105 100	100 100	   CE OE	125 55	100 22	1 0 10
Munuscong		Fine sandy loam	SM, SC-SM, SC		1 0	1 0	95-100	•	•	•	•	•
	I	Sandy loam, fine sandy   loam	SC-SM, SC 	A-4, A-2 	i	1	95-100 	İ	İ	İ	İ	İ
	30-60 	Silty clay, silty clay   loam, clay	CL, CH	A-7 	0 	0 	95-100 	90-100 	80-100 	70-95 	45-86 	25-59 
1444487:	! 		i		i	i	i	i	i		i	
Superior	0-3   	Fine sandy loam   	SC-SM, SM,   SC, CL-ML,   ML	A-4, A-2   	0   	0   	85-100   	75-100   	55-85   	30-55   	20-33   	3-10   
	3-6 	Sandy loam, fine sandy   loam, loam	SC-SM, SM,   ML, SC,   CL-ML	A-4, A-2	0 	0 	85-100 	75-100 	45-95 	25-75 	17-27 	2-8
	6-14 	Sandy loam, fine sandy   loam, loam	•	A-4, A-2 	0 	   0 	  85-100 	  75-100 	  45-95 	25-75 	  19-28 	3-10
	14-19 	Clay loam, sandy loam,   clay, silty clay	CH, CL	A-7	i 0	0	95-100 	90-100	55-100 	25-95 	45-74 	  25-48 
	19-26	Clay, silty clay	CH	A-7	I 0	i 0	95-100	90-100	80-100	70-95	54-82	132-55
		Clay, silty clay	CL, CH	A-7	j 0	0	95-100					
Sedgwick	   0-5	  Loamy sand	SM, SC-SM, SC	ו 1   2   2   4	1 0	I 0-3	  80-100	175-98	1 145-90	120-50	123-37	Ι Ι Δ-12
beaguion		Loamy sand, fine sandy	SP-SM, SM, SC		1 0	1 0-3	80-100					
	30	loam, sandy loam,	I	A-1-b						1	0 20	
	   8-16	loamy fine sand  Sandy loam, fine sandy	SC-SM, SC	  A-4, A-2-4	0	0-3	  80-100	  75-98	  45-90	120-50	21-33	4-12
	1 16 10	loam	l cr cr	13.7.7.6	1	1 0 0	100 100	105.00	160.05	150 05		110 51
	   TP-TA	Clay, silty clay loam,   sandy loam, clay loam	CL, CH 	A-7, A-6 	0 	0-3 	98-100 	95-98 	160-95 	50-85 	131-18	12-51
	19-53	Clay, clay loam, silty	CH, CL	A-7	į o	0-3	98-100	95-98	85-95	75-85	41-78	21-51
	53-80		CH, CL	A-7	1 0	0-3	198-100	195-98	  85-95	  75-95	141-78	21-51
	I	loam, clay, clay loam	I	1	I	I	I	I		I	1	1

Table 14.-Engineering Properties-Continued

		1	Classi	fication	Frag	ments	l P	ercenta		-	1	1
Map unit symbol	Depth	USDA texture	1		1		<u> </u>	sieve	number-		Liquid	Plas-
and soil name		1	1	1	>10	3-10	1	1	I	I	limit	ticity
	1	1	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	1	ı	I	Pct	Pct	ī	ī	ı	ı	Pct	I
	Ι	1	1	1	1	1	1	1	l	I	1	1
1444488:	1	I	1	1	1	1	1		l	I	1	I
Superior	0-3 	Fine sandy loam	SC-SM, SM,   SC, CL-ML,	A-4, A-2 	I 0	0 	85-100 	75-100 	55-85 	30-55 	20-33 	3-10 
	İ	Ì	ML	İ	İ	İ	İ	İ	İ	İ	i	İ
	3-6	Sandy loam, fine sandy	SC-SM, SM,	A-4, A-2	0	0	85-100	75-100	45-95	25-75	17-27	2-8
	I I	loam, loam	ML, SC,   CL-ML	] 	 	 	 	 	 	 	 	 
	6-14	Sandy loam, fine sandy	•	A-4, A-2	i o	i o	85-100	75-100	45-95	25-75	119-28	3-10
	İ	loam, loam	CL-ML, SM,	İ	į	į	į	İ	 	 	į	İ
	ı I 14–19	Sandy loam, clay, silty	•	IA-7	1 0	i 0	195-100	190-100	ı 155–100	1 125-95	  45-74	125-48
	1 17 17	clay, clay loam	I	<del>                                    </del>	i	i	1	1	33 ±00	123 33	1 25 / 2	123 40
	1 19-26	Clay, silty clay	, I CH	  A-7	i 0	i 0	195-100	190-100	80-100	170-95	54-82	132-55
		Clay, silty clay	•	A-7	i 0	•	•	•	•		49-78	•
	i	i	i '	İ	i	i	i	į	İ	İ	i	į
Sedgwick	0-5	Loamy sand	SM, SC-SM, SC	A-4, A-2-4	0	0-3	180-100	75-98	45-90	20-50	23-37	4-12
	5-8	Loamy sand, fine sandy	SP-SM, SM, SC	A-4, A-2-4,	0	0-3	80-100	75-98	30-90	10-50	0-28	NP-10
	1	loam, sandy loam,	1	A-1-b	1	1	1	1	l	I	1	1
	1	loamy fine sand	1	1	1	1	1		l	I	1	I
	8-16	Sandy loam, fine sandy	SC-SM, SC	A-4, A-2-4	0	0-3	80-100	75-98	45-90	20-50	21-33	4-12
	1	loam	I	I	1	1	1	1	l	I	1	1
	16-19	Clay, silty clay loam,	CL, CH	A-7, A-6	1 0	0-3	98-100	95-98	60-95	50-85	31-78	12-51
	1	sandy loam, clay loam	1	I	1	1	1	1	Ι	1	1	1
	19-53		CH, CL	A-7	1 0	0-3	98-100	95-98	85-95	75-85	41-78	21-51
		clay loam, silty clay			1	1		105.00				
	53-80		CH, CL	A-7	1 0	0-3	188-100	95-98	85-95	75-95	41-78	121-51
	1	loam, clay, clay loam	!	1	1	!	!	!	!	1	1	!
1444489:	1	1	1	1	1	!	1	1	! !	1	1	!
Sultz	I 0-2	  Highly decomposed plant	I IDT	  A-8	1 0	1 0	1 100	1 100	1   100	1 1 100	! !	
Suicz	1 0 2	material	1	I O	1	1	1 100	1 100	1 100	1 100	<u> </u>	
	1 2-6	Sand, loamy sand	SP-SM, SM	  A-3, A-1-b	. 0	1 0-7	180-100	175-100	1 140-75	ı I 5–30	0-20	IND-2
		Sand, loamy sand		A-3, A-1-b	1 0						0-23	
		Sand, fine sand		A-3, A-1-b	i o						0-17	
		Sand, fine sand		A-3, A-1-b	i o						0-17	
		Stratified sand to fine		A-4, A-2-4	0	•					0-32	
	i		CL-ML, ML	i ,	i	i	i	i			i	i
	I	very fine sandy loam	1	I	I	I	1	I	I	I	1	l
	I	1	1	1	1	I	1	1	I	I	1	1

Table 14.-Engineering Properties-Continued

   Map unit symbol	Depth	   USDA texture	Class	ification	Frag	ments	P		ge pass	-	  Liquid	    Plas-
and soil name		I	1	1	>10	3-10	ī	ı	ı	I	   limit	ticity
I		I	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	I	ı	1	Pct	Pct	ī	Ī	Ī	I	Pct	ī
I		I	I	1			1	I	I	I		1
1444489:		I	1	1	I	1	1	I	I	I	1	1
Ashwabay	0-4	Loamy sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	30-75	10-35	0-14	NP-1
l I	4-5	Sand, fine sand, loamy   sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	40-80	5-35	0-19	NP-1
i i	5-12	•	SP-SM, SM	A-3, A-2, A-1	I I 0	0	  90-100	  80-100	  40-80	   5-45	0-19	  NP-1
I		sand, loamy fine sand	1	1	l	1	1	I	I	I	1	1
I	12-32	Sand, loamy sand, fine	SP-SM, SM	A-3, A-2, A-1	1 0	0	90-100	80-100	40-80	5-35	0-19	NP-1
I		sand	1	1	I	1	1	I	I	l	1	1
I			SP-SM, SM	A-3, A-2, A-1		•	90-100	•	•	•	•	•
 		Clay, clay loam, silty   clay	CL, CH	A-7 	I 0	] 0 ]	90-100	80-100 	70-100 	55-95 	45-69 	25-44 
i		Stratified clay to silt	ICL, CH	  A-7	I 0	i 0	90-100	80-100	40-100	I 5-95	i 0-69	NP-44
i		to sand	1	İ	i	i	İ	İ	İ	i	i	I
!		1			l ,	1						
Rubicon				M A-3, A-2, A-1			190-100					
!				M A-3, A-2, A-1			190-100					
ļ	6-18	•		M A-3, A-2, A-1			190-100					
ļ	18-36	•		M A-3, A-2, A-1	•		190-100					
	36-60	Sand	ISP, SP-SM, S	M A-3, A-2, A-1	1 0	0	90-100	180-100	140-70	1 0-12	1 0-19	INP-Z
1444492:		! !	1	1	! !		!	! !	! !	! !	!	
Manistee	0-3	  Sand	SM	  A-2-4, A-1-b	I 0		195-100	1 190-100	1 145-70	   5-15	0-32	INTD-7
11411125666		Sand, loamy sand, loamy	•	A-3, A-2-4,	1 0		195-100		•	•	0-24	•
i		fine sand, fine sand	1	A-1-b	i	i	1		, I	, I	i	1
i	11-28	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-2-4,	I 0	i 0	95-100	90-100	45-80	5-45	0-24	NP-7
i		fine sand, fine sand	i ′	A-1-b	İ	i	i	i	İ	İ	i	i
i	28-30	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-2-4,	0	0	95-100	90-100	45-80	5-45	0-24	NP-7
I		fine sand, fine sand	1	A-1-b	I	I	1	I	I	I	1	1
I	30-38	Clay, silty clay, clay	CH, CL	A-7	0	0	95-100	90-100	80-100	65-95	45-68	25-44
I		loam, silty clay loam	1	1	l	1	1	I	I	l	1	1
I	38-60	Clay, silty clay, clay	CL, CH	A-7	1 0	0	95-100	90-100	80-100	65-95	45-68	25-44
l I		loam, silty clay loam		1	 	1	1	 	 	 	1	
Kellogg	0-2		  PT	A-8	0	0	100	1 100	1 100	100	i	i
I		plant material	1	1	l		1	I	I	l	1	
 	2-6	Sand	SP-SM, SM	A-3, A-2-4,   A-1-b	0 	0-5 	90-100 	85-100 	40-70 	5-15 	0-22 	NP-4 
į	6-26	Sand, loamy sand	SM, SP-SM	A-3, A-2-4,	i 0	0-5	90-100	85-100	40-75	5-30	0-26	NP-7
!	06.00	1		A-1-b	l ,	1	106 100	106 100			110 65	1
l I	26-29	Silty clay, clay, silty   clay loam, loamy sand		A-7 	I 0	I 0	96-100 	96-100 	50-100 	40-95 	19-65 	3-40 
i			CL	i	i	i	i	i	i	i	i	i
i	29-40	  Silty clay, clay, silty	•	'  A-7	I 0	I 0	95-100	95-100	90-100	70-95	45-69	25-44
i		clay loam	i , -	i	İ	i	i		İ		İ	i
i		Silty clay, clay, silty	CL, CH	A-7	0	0	95-100	95-100	90-100	70-95	41-69	21-44
į		clay loam	1	1	I	I	I	I	I	I	I	1
I		I	1	1	l	1	1	I	I	I	1	1

Table 14.-Engineering Properties-Continued

Depth	USDA texture	1									
		<b>'</b>		<u> </u>		<u> </u>	sieve	number-		Liquid	Plas-
	I	I	1	>10	3-10	1	1	1	I		ticity
	<u> </u>	Unified	AASHTO	in	in	4	10	40	200	<u> </u>	index
In	l	I	1	Pct	Pct	1	1	1	I	Pct	1
	l	I	1		1	1	1		I	1	1
	l	I		l	1	1			1	1	1
0-4	Loamy sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	30-75	10-35	0-14	NP-1
4-5	Sand, fine sand, loamy	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	sand	I	1	l	1	1	1	1	I	1	1
	· ·	SP-SM, SM	A-3, A-2, A-1	0	0	90-100	80-100	40-80	5-45	0-19	NP-1
		I	1	l	I	1	1	1	I	1	1
		SP-SM, SM	A-3, A-2, A-1	0	0	90-100	80-100	40-80	5-35	0-19	NP-1
	•	I		l	I	1	1	l	I	1	I
	•	. ,			•	•	•	•		•	•
		CL, CH	A-7	0	0	90-100	80-100	70-100	55-95	45-69	25-44
		1	! _		!				!		
	<del>-</del>	CL, CH	A-7	0	0	190-100	180-100	40-100	5-95	0-69	NP-44
	to sand	!			!	!	!	!	!	!	!
		!			!	!	!	!	!	!	!
0 0	 		12 0 4 2 0		1 0 00	100 100	175 100	140 75	115 20	1 0 00	1277 10
					1 0-50	182-100	102-100	145-75	112-32	1 0-20	IND-IO
		!	W-I-D	l 1	1	1	1	1	1	1	!
		! !	1	l I	1	!	!	1	1	1	1
		IOM CC_CM CC	   7 – 2 – 4	ı ı ∩	1 0-25	105_100	165_100	   16-75	115_25	1 0-20	IND_10
				, v	1 0-25	102-100	102-100	143-73	1 12-22	1 0-20	INF-IO
		<u>.</u>	1	! 	i i	i	i	<u> </u>	! !	i	i
		<u>'</u>	i	! 	i	i	i	<u> </u>	! !	i	i
	•	ISM SP-SM	  A-1-b A-2	, I 0	1 1 0-25	185-100	165-100	145-75	1 110-25	1 0-20	IND-10
			1	İ	1	1	1	1	1	1	1
		1	i	i	i	i	i	i	i	i	i
		i	i	i	i	i	i	i	i	i	i
	•	SM, SP-SM,	A-2-4, A-2,	I 0	0-25	85-100	65-100	45-75	10-25	0-23	NP-10
			A-1-b	i	i	i	i	i	i	i	i
	fine sand	İ	İ		İ	İ	İ	İ	İ	i	İ
27-43	Sand, cobbly loamy	SM, SP-SM,	A-2, A-2-4,	0	0-25	85-100	65-100	40-80	5-20	0-27	NP-10
	sand, gravelly loamy	SC, SC-SM	A-3, A-1-b	l	I	I	I	I	I	1	I
		I	1	l	I	I	I	I	I	1	1
43-75	Loamy sand, sandy loam,	SM, SC-SM, SC	A-2-4, A-2,	0	0-25	85-100	65-100	45-80	10-30	0-30	NP-10
	gravelly loamy fine	I	A-1-b	l	I	I	1	1	I	1	1
		I	1	l	I	I	1	I	I	1	1
75-80	Loamy sand, gravelly	SM, SP-SM,	A-2-4, A-2,	0	0-25	85-100	65-100	45-75	10-25	0-20	NP-10
	loamy sand, cobbly sand	SC, SC-SM	A-1-b	l	I	1	1	I	I	1	1
1 34 6 1 2 4	4-5 5-12 12-32 12-32 13-45 15-62 15-62 15-62 4-16 16-20 16-20 17-43 13-75 175-80	4-5   Sand, fine sand, loamy   sand   5-12   Sand, loamy sand, fine   sand, loamy fine sand   12-32   Sand, loamy sand, fine   sand   12-45   Sand, fine sand   15-62   Clay, clay loam, silty   clay   15-80   Stratified clay to silt   to sand   1	4-5   Sand, fine sand, loamy   SP-SM, SM   sand   Sand, loamy sand, fine   SP-SM, SM   sand, loamy sand, fine   SP-SM, SM   sand, loamy sand, fine   SP-SM, SM   sand   SP-SM, SM   SAND, sand   SP-SM, SM   SAND, sand   SP-SM, SM   SAND, sand   SP-SM, SM   SAND, sand   SP-SM, SM   SC-SM, SM   SC-SM   SC-SM   SC-SM, SC	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   0   0     sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   0   90-100   sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   0   90-100   80-100   5-12   Sand, loamy sand, fine   SP-SM, SM   A-3, A-2, A-1   0   0   90-100   80-100   5-12   Sand, loamy fine sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   0   90-100 80-100 40-80   sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   0   90-100 80-100 40-80   5-35   sand	4-5   Sand, fine sand, loamy   SP-SM, SM   A-2, A-1   0   0   90-100 80-100 40-80   5-35   0-19

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	   USDA texture	Clas	ssi	fication	Frag	ments	P	ercenta sieve	ge pass number-		  Liquid	   Plas-
and soil name	ļ.	!				>10	3-10	<u> </u>	<u> </u>	1	I		ticity
	   In		Unified		AASHTO	in   Pct	in   Pct	1 4	1 10	40	1 200	   Pct	index
	¦ <del>==</del>	İ	i		' 	1	1	i	' 		i	1	' 
1444506:	i	i	i		i	i	i	i	i	i	i	į	i
Rubicon	0-1	Sand	SP-SM, SM		A-3, A-2-4,	1 0	0	190-100	180-100	140-70	5-15	0-14	NP
	   1-6	  Sand	  SP-SM, SM		A-1  A-3, A-2-4,	I I 0	I I 0	  90-100	100_100	140-70	   5-15	   0-14	   NP
	I-0		SF-SM, SM		A-3, A-2-4,   A-1	1	i	90-100	 	<del>1</del> 0	1 2-13	U-14	NF
	6-18	Sand	SP-SM, SM		A-3, A-2-4,	j 0	j 0	90-100	80-100	40-70	5-15	0-14	NP
		!			A-1	1	1						!
	18-36	Sand	SP-SM, SM		A-3, A-2-4,   A-1	0	0	190-100	1 180-TOO	140-70	5-15	0-14	NP
	36-60	Coarse sand, sand	SP-SM, SM		A - 3	0	0	90-100	  80-100	  40-70	5-15	0-14	NP
	I	1	1		A-1	1	I	I	I	I	1	I	I
1444507:	!		1		<u> </u>	1	1	!	1	1	!	!	1
Keweenaw	   0-2	  Loamy sand	SM, SC-SM,	sc	I IA-2-4. A-2	1 0-2	I I 0-20	1 190-100	ı 175-100	I 140-75	I I15-30	   0-20	INP-10
	•	Gravelly loamy fine			A-2-4, A-2,	0						0-20	
	ļ .	sand, cobbly loamy	!		A-1-b	1	I	!	I	I	1	!	I
	 	sand, sandy loam,   loamy sand	I I		 	1	 		 		!	!	 
	   4-16	Loamy sand, gravelly	SM, SC-SM,	sc	  A-2-4,	0	0-25	  85-100	  65-100	  45-75	115-35	0-20	  NP-10
	ĺ	loamy sand, sandy	i		A-1-b, A-2	İ	İ	Ì	İ	İ	İ	İ	İ
	!	loam, cobbly loamy	!		! :	!	!	!	!	!	!	!	!
	I I 16-20	fine sand  Loamy sand, cobbly	  SM, SP-SM,		  A-1-b, A-2	1 0	I I 0-25	I 185-100	I 165-100	I I 45-75	I I10-25	I I 0-20	l INTP−10
	10 20	loamy fine sand,	SC, SC-SM			i	1			1	1	1	
	I	gravelly loamy sand,	1		I	1	I	I	I	I	1	I	I
		sand	law ab aw			I I 0	1 0 05	105 100	   CE 100		110.05	1 0 00	1377 10
	20-27 	Loamy sand, cobbly   sand, gravelly loamy	SM, SP-SM,   SC, SC-SM		A-2-4, A-2,   A-1-b	1 0	U-25 	182-100	  02-T00	45-75 	10-25 	0-23 	IND-IO
	i	fine sand	i		i	i	i	i	i	i	i	i	i
	27-43		SM, SP-SM,		A-2, A-2-4,	1 0	0-25	185-100	65-100	140-80	5-20	0-27	NP-10
	 	sand, gravelly loamy   fine sand, sandy loam	SC, SC-SM		A-3, A-1-b	1	1	1			1	1	
	   43-75	Loamy sand, sandy loam,	SM, SC-SM,	sc	  A-2-4, A-2,	0	0-25	  85-100	  65-100	  45-80	10-30	0-30	  NP-10
	ĺ	gravelly loamy fine	i		A-1-b	İ	İ	İ	İ	Ì	İ	İ	İ
		sand, fine sandy loam				1		105 100			110.05	1	
	/5-80 	Loamy sand, gravelly   loamy sand, cobbly sand	SM, SP-SM,		A-2-4, A-2,   A-1-b	1 0	U-25 	182-100	102-100	45-75 	110-25	0-20	IND-IO
	i		1			i	i	i	i	i	i	i	i
Rubicon	0-1	Sand	SP-SM, SM		A-3, A-2-4,	0	0	90-100	80-100	40-70	5-15	0-14	NP
	   1-6	  Sand	I CD CM CM		A-1	I I 0	1	100 100	100 100	140 70			
	T-0	Sand	SP-SM, SM		A-3, A-2-4,   A-1	ı U	0 	90-100 	100-100	140-70 	1 2-12	0-14 	NP 
	6-18	Sand	SP-SM, SM		A-3, A-2-4,	i o	i 0	90-100	80-100	40-70	5-15	0-14	NP
		!			A-1								
	18-36	Sand	SP-SM, SM		A-3, A-2-4,   A-1	0	0	190-100	80-100	40-70 	5-15	0-14	NP
	,   36-60	  Coarse sand, sand	SP-SM, SM		A-1  A-3, A-2-4,	1 0	1 0	  90-100	  80-100	  40-70	,   5-15	   0-14	I   NP
	I	1	1		A-1	1	I	I	I	I	1	I	I

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Table 14.-Engineering Properties-Continued

   Map unit symbol	Depth	   USDA texture	Classi	fication	Frag	ments	Pe		ge pass: number-	_	  Liquid	   Plas-
and soil name		I	1	<u> </u>	>10	3-10	ī	ı	ı	ı	limit	ticity
		<u> </u>	Unified	AASHTO	in	in	4	10	40	200	<del> </del>	index
!	In	!	1	!	Pct	Pct	!	!	!	l	Pct	1
1444585: I		! !	1	 	] ]	1	! !	l I	 	 	 	 
Meehan, beaches-	0-4	Sand	SM	  A-2, A-1	0	i o	90-100	75-100	40-90	5-15	0-14	NP
I	4-29	Sand, loamy sand, loamy   coarse sand	SP-SM, SP, SM	A-3, A-2, A-1	0	0 	90-100 	75-100 	40-90 	3-30 I	0-14 	NP
!	29-60	Sand, coarse sand	SP-SM, SP	A-3, A-2, A-1	0	1 0	90-100	75-100	40-90	0-5	0-14	NP
1444586:		! !	! 	! 	 		! 	! 	! 	! 	 	
Wurtsmith,		İ	İ	İ		İ	ĺ	İ	İ	l	ĺ	ĺ
beaches	0-1	Moderately decomposed   plant material	PT 	A-8	0	0 	 	 	 	 	 	 
I	1-4	Sand	SP-SM, SM	A-2, A-1	0	0	90-100	80-100	30-75	10-30	0-14	NP
 	4-24	Sand, coarse sand,   loamy sand	SP-SM, SP, SM	A-3, A-2, A-1  	) 0 	0 	90-100 	80-100 	25-70 	3-15 	0-14 	NP 
I	24-48	Sand, coarse sand	SP-SM, SP, SM	A-3, A-2, A-1	0	0	90-100	80-100	25-70	3-15	0-14	NP
!	48-80	Sand, coarse sand	SP-SM, SP, SM	A-3, A-2, A-1	0	1 0	90-100	80-100	25-70	3-15	0-14	NP
1444587:   Grayling,		 	! ! !	 	   	 	! 	!   	!   	!   	 	 
beaches	0-3	Sand	SP-SM, SP, SM	A-3, A-2, A-1	0	i 0	95-100	90-100	I 45-70	3-15	I 0-14	I NP
	3-15	•		A-3, A-2, A-1		•	95-100	•	•	•	•	l NP
i	15-23	•		A-3, A-2, A-1		•	95-100	•	•	•	•	NP
į		Sand, coarse sand		A-3, A-2, A-1			95-100					NP
1529830: I		! !	1	 	]	1	 	 	l I	l I	 	 
Meehan, beaches-	0-4	Sand	SM	A-2, A-1	0	i 0	90-100	75-100	40-90	5-15	0-14	NP
, i	4-29	Sand, loamy sand, loamy   coarse sand	SP-SM, SP, SM	A-3, A-2, A-1  	0	i 0 I	  90-100 	75-100 	40-90 	3-30 	0-14 	NP
!	29-60	Sand, coarse sand	SP-SM, SP	A-3, A-2, A-1	0	1 0	90-100	75-100	40-90	0-5 	0-14	NP
1700372:		! !	! 	! 	 		! 	! 	! 	 	 	
Loxley	0-13	Mucky peat	PT	A-8	0	1 0	100	100	100	100		NP
	13-60	Muck	PT	A-8	0	I 0	100	100	100	100		NP
  Beseman	0-36	  Muck	  PT	  A-8	0	1 0	   100	   100	   100	   100		 
İ	36-60		SC-SM,	A-2-4, A-4	0	0-2	80-100	75-100	45-100	25-90	20-33	4-13
 		loam	CL-ML, CL	] 		1	 	 	 	 	 	 
Dawson		Peat	•	A-8	0	i o	100	1 100	100	1 100	i	i
I	8-38	•		A-8	0	1 0	100	•	•	100		
		Silt loam, loam, fine   sand, mucky sand	ML, SM 	A-4, A-2-4 	0 	0 	100 	İ	50-100 	İ	0-59 	NP-9 
 	40-60		SP, SP-SM,   GP, SM	A-3, A-4,   A-1, A-2	) 0 	0 	45-100 	35-100 	15-90 	0-45 	0-23 	NP-6 
I		fine sand	1			1	1	l	l	l	1	1

	I	1	Class	ification	Frag	ments	l P	ercenta	ge pass	ing	ī	ī
Map unit symbol	Depth	USDA texture	1		l		1	sieve	number-	_	Liquid	Plas-
and soil name	l	1	1	1	>10	3-10	1	1	1	1	limit	ticity
	l	1	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	1	I	ı	Pct	Pct	ī	ı	ī	I	Pct	Ī
	l	1	1	1	l	1	1	1	1	1	1	1
1700373:	l	I	1	1	l	1	1	1	1	1	1	1
Rifle	•	Peat	PT	A-8	1 0	1 0	100	100	100	100		NP
	4-60	Mucky peat	PT	A-8	J 0	1 0	100	100	100	100		NP
1700374:	! 	i	i	i I	! 	i	<u> </u>	i	i	 	i	
Allendale	0-3	Loamy fine sand	SM	A-4, A-2-4	0	0	95-100	90-100	65-80	25-40	0-31	NP-6
	3-10	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-4,	J 0	0	95-100	90-100	45-85	5-40	0-28	NP-10
	I	fine sand, sandy loam,	1	A-1-b, A-2-4	I	1	I	I	1	I	1	1
	I	fine sandy loam	1	1	l	1	1	1	1	1	1	1
	10-13	Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	0	0	95-100	90-100	45-80	5-40	0-23	NP-6
	l	fine sand, loamy sand	1	A-1-b, A-2-4	l	1	1	1	1	1	1	1
	13-26	· · · · · · · · · · · · · -	SP-SM, SM	A-2-4,	1 0	1 0	95-100	90-100	45-80	5-40	0-23	NP-6
	l	fine sand, loamy sand	1	A-1-b, A-4,	I	1	1	1	1	1	1	1
	l	I	1	A-3	l	1			1	I	1	1
		Sand, fine sand, loamy	SP-SM, SM	A-3, A-4,	1 0	1 0	95-100	90-100	45-80	5-40	0-23	NP-6
		fine sand, loamy sand	1	A-1-b, A-2-4		!				<u> </u>		
		Clay, silty clay	CH	A-7	1 0	1 0	•	•	190-100	•	•	•
	34-60 	Clay, silty clay	CH	A-7	0	0	100	98-100	90-100	75-95 	49-69	29-44
Wakeley	   0-4	Muck	PT	  A-8	, I 0	0	100	100	1 100	100		
	4-23	Loamy sand, sand, loamy	SP-SM, SM,	A-4, A-3,	0	0-5	90-100	80-100	40-90	5-45	0-24	NP-6
	l	fine sand, fine sand	SC-SM	A-2-4	I	1	1	1	1	1	1	1
	23-28	Loamy sand, sand, loamy	SP-SM,	A-4, A-3,	J 0	0-5	90-100	80-100	40-90	5-45	0-24	NP-6
			SC-SM, SM	A-2-4	I	1	1	1	1	1	1	1
	28-80	Clay, silty clay	[CL, CH	A-7	I 0	1 0	95-100	90-100	190-100	75-95	49-69	29-44
Kinross	ı I 0-6	  Muck	I IPT	I IA-8	I I 0	1 0	I I 100	I I 100	I I 100	I I 100		
		• • •	SP-SM, SM	A-3, A-2-4	i o	i o			150-80		I 0-24	NP-6
	i	sand, loamy fine sand	i ,	i -,	i	i	i	i	i	i	i	i
	10-12	Sand, fine sand, loamy	SP-SM, SM	A-3, A-2-4	0	j 0	100	90-100	50-80	5-30	0-31	NP-6
	l	sand	1	1	I	I	l	I	I	l	1	Ι
	12-24	Sand, fine sand	SP-SM, SM	A-3, A-2-4		0	100	90-100	50-80	5-30	0-26	NP-6
	24-42	Sand, fine sand	SP-SM, SM	A-2-4, A-3	0	0	100	90-100	50-80	5-30	0-26	NP-6
	42-60	Sand, fine sand	SP-SM, SM	A-3, A-2-4	J 0	0	100	90-100	50-80	5-30	0-23	NP-6
	l	I	1	I	I	1	l	I	I	l	1	1

Table 14.-Engineering Properties-Continued

	l	1	Classi	fication	Frag	ments	P	ercenta	ge pass	ing	I	1
Map unit symbol	Depth	USDA texture	1		I		1	sieve	number-	-	Liquid	Plas-
and soil name	I	1	1	ī	>10	3-10	T	ī	ī	ī	limit	ticity
	l	1	Unified	AASHTO	in	in	4	10	40	200	1	index
	In	1	I	I	Pct	Pct	ī	Ī	ī	ī	Pct	ī
	ı —	I	1	1			1	I	I	1		I
1702605:	I	I	1	1	I	I	1	I	I	1	1	I
Menominee	0-4	Loamy sand	SP-SM, SM	A-2-4	0	0-7	75-100	75-100	20-90	5-50	0-33	NP-10
	4-7	Sand, loamy sand, fine	SP-SM, SM	A-2-4	0	0-7	75-100	65-100	20-90	5-50	16-27	2-10
	I	sand, gravelly loamy	1	1	I	1	1	I	I	1	1	
	I	fine sand	1	1	I	1	1	I	I	1	1	
	7-23	Sand, loamy sand, fine	SP-SM, SM	A-2-4	0	0-7	75-100	65-100	20-90	5-50	0-25	NP-7
	l	sand, gravelly loamy	1	1	I	1	1	I	1	1	1	I
	I	fine sand	1	1	I	1	1	I	1	1	1	1
	23-39	Clay loam, loam, silty	SC, SC-SM,	A-6, A-4, A-2	0	0	95-100	85-95	50-95	25-75	20-44	6-25
	I	clay loam, sandy loam	CL, CL-ML	1	I	1	1	I	1	1	1	1
	39-59	Clay loam, loam, silty	SC, SC-SM,	A-6, A-4,	0	0	95-100	85-95	50-95	25-75	24-46	7-25
	l	clay loam, sandy loam	CL, CL-ML	A-2-4	I	1	1	I	1	1	1	1
	59-80	Loam, clay loam, silty	SC, SC-SM,	A-6, A-4,	0	1 0	95-100	85-95	50-95	25-75	22-42	6-21
	<u> </u>	clay loam, sandy loam	CL, CL-ML	A-2-4	I	!	1	ļ	1	1	1	1
1702606:	 	! !			! 			! 	 			 
Deerton	0-1	Highly decomposed plant	PT	A-8	0	0	100	100	100	100		NP
	I	material	1	1	I	I	1	I	I	1	1	I
	1-9	Sand	SP-SM, SM	A-3, A-2-4,	0-7	0-30	55-100	45-100	25-70	0-15	0-26	NP-6
	I	I	1	A-1-b	I	1	1	I	I	1	1	
	9-10	Loamy sand, sand,	SP-SM, SP, SM	I A-3, A-2-4,	0-7	0-30	55-100	45-100	25-75	0-30	0-26	NP-7
	l	channery loamy sand,	1	A-1-b	I	1	1	I	1	1	1	I
	I	flaggy sand	1	1	I	1	1	I	1	1	1	1
	10-25	Sand, loamy sand,	SP-SM, SP, SM	I A-3, A-2-4,	0-7	0-30	55-100	45-100	25-75	0-30	0-26	NP-7
	l	channery loamy sand,	1	A-1-b	I	I	1	I	1	1	1	I
	l	flaggy sand	1	1	I	I	1	I	1	1	1	I
	25-39	Weathered bedrock										
	39-80	Unweathered bedrock										
	I	1	1	1	I	1	I	I	1	1	1	1

Table 14.-Engineering Properties-Continued

Map unit symbol	   Depth	USDA texture	Classi	fication	Frag	ments	l P	ercenta sieve	ge pass: number-	_	  Liquid	    Plas-
and soil name	_	İ	1	1	>10	I 3-10	i i				. limit	ticity
i		İ	Unified	AASHTO	in	in	4	1 10	40	200	i	index
	In	<u> </u>	<u> </u>	<u> </u>	Pct	Pct	i	<del>i</del>	<del>i</del>	i I	Pct	i i
1		I.	1	1			1	I	ı	I		1
1702606:		İ	i	i	i	i	i	i	į.	İ	i	i
Brownstone	0-2	Highly decomposed plant   material	PT	A-8 	i 0	i 0	100 	100 	100 	100 	 	NP
	2-12   	Very cobbly sand   	SM, SP,   SP-SM, GM,   GP, GP-GM	A-3, A-1-b   	0-15   	15-55   	20-95   	10-85   	5-65   	3-30   	0-14   	NP   
	12-15     	Extremely gravelly   coarse sand, extremely   cobbly sand, extremely   cobbly coarse sand,   gravelly loamy coarse   sand		A-3, A-1-b         	0-15         	15-55         	20-95         	10-85           	5-70         	0-25         	0-24       	NP-2         
	15-23	Extremely cobbly sand,   extremely gravelly   coarse sand, extremely   cobbly coarse sand,   gravelly loamy coarse   sand	SP-SM, GM,	A-3, A-1-b           	0-15         	15-55         	20-95         	10-85         	5-70         	0-25           	0-22         	NP-2         
	23-33	Extremely cobbly coarse   sand, extremely cobbly   sand, extremely   gravelly coarse sand,   gravelly loamy coarse   sand		A-3, A-1-b           	0-15         	15-55         	20-95         	10-85         	5-70         	0-25           	0-19         	NP-2         
i	33-80	Unweathered bedrock	i	i	i	i	i	i	i		i	i
1		I	1	1	1	1	1	1	I	I	1	1
1702607:		I	1	1	1	1	I	I	I	I	1	I
Deerton	0-1 	Highly decomposed plant	PT 	A-8 	0 	I 0	100 	100 	100 	100 	 	NP 
1	1-9 	Sand		A-3, A-2-4,   A-1-b	0-7 	0-30 	55-100 	45-100 	25-70 	0-15 	0-26 	NP-6 
 	9-10   	Loamy sand, sand,   channery loamy sand,   flaggy sand	SP-SM, SP, SM   	A-3, A-2-4,   A-1-b 	0-7   	0-30   	55-100   	45-100   	25-75   	0-30   	0-26   	NP-7   
 	10-25   	Sand, loamy sand,   channery loamy sand,   flaggy sand	SP-SM, SP, SM   	A-3, A-2-4,   A-1-b 	0-7   	0-30   	55-100   	45-100   	25-75   	0-30   	0-26   	NP-7   
i	25-39	Weathered bedrock										
	39-80	Unweathered bedrock	I	I	1	1	1	I	I	I	1	l

Table 14.—Engineering Properties—Continued

			:	fication		ments	! -	ercenta		-	! .	! _
Map unit symbol	Depth	USDA texture	l					sieve	number-			Plas-
and soil name	!	!			>10	3-10	•					ticity
	<u> </u>	<u> </u>	Unified	AASHTO	in	in	4	10	40	200	<u>.                                    </u>	index
	In	I		1	Pct	Pct	1	I	I	I	Pct	1
	1	I	1	1	1	1	1	1	I	1	1	1
1702607:	1	I	1	1	1	1	1	1	I	1	1	1
Brownstone	0-2	Highly decomposed plant	PT	A-8	1 0	1 0	100	100	100	100		NP
	!	material	1	!	!	!			!			1
	2-12	Very cobbly sand	SM, SP,	A-3, A-1-b	0-15	115-55	20-95	110-85	5-65	3-30	0-14	NP
	!	!	SP-SM, GM,	!	!	!	!	!	!	!	!	!
	1 10 15		GP, GP-GM	1 2 2 3 1 3	1 0 15	115 55	100.05	110.05	- 70	1 0 05	1 0 04	1277
	1 12-15		SM, SP,	A-3, A-1-b	1 0-12	115-55	20-95	110-82	5-70	0-25	0-24	NP-2
	1	coarse sand, extremely   cobbly sand, extremely		1	-	!	!	!	1	!		1
	1	cobbly coarse sand,	GP, GP-GM	1	-	!	1	!	1	1	1	1
	! !	gravelly loamy coarse	1	1	-	1			! !			1
	! !	graverry roamy coarse	1	1	-	1			! !			1
	I I 15-23	Extremely cobbly sand,	ISM SP	  A-3, A-1-b	1 0-15	115-55	  20-95	1 110-85	ı I 5-70	1 0-25	0-22	IND-2
	1		SP-SM, GM,	1	1 0 10	1	1	1	1 3 70	1 0 23	1 0 22	1
	i	coarse sand, extremely		i	i	i	i	i	i	i	i	i
	i	cobbly coarse sand,	1	i	i	i	i	i	i	i	i	i
	i	gravelly loamy coarse	i	i	i	i	i	i	i	i	i	i
	i	sand	i	i	i	i	i	i	i	i	i	i
	23-33	Extremely cobbly coarse	SM, SP,	A-3, A-1-b	0-15	15-55	20-95	10-85	I 5-70	0-25	0-19	NP-2
	İ	sand, extremely cobbly		i	i	İ	İ	İ	İ	İ	İ	i
	1	sand, extremely	GP, GP-GM	I	1	1	1	1	I	1	1	1
	1	gravelly coarse sand,	1	1	1	1	1	I	I	1	1	1
	1	gravelly loamy coarse	1	1	1	1	1	1	I	1	1	1
	1	sand	1	1	1	1	1	1	1	1	1	1
	33-80	Unweathered bedrock										
	I	I		1	I	1	1	1	I	1	1	1
	I	I	1	1	I	1	1	1	I	1	1	1
Abbaye	0-2		PT	A-8	1 0	0	100	100	100	100		
	1	• •	1	1	1	1	1	1	1	1	1	1
	•	•		•		•	•	•		•	•	
	4-13		SM, SC-SM	A-4, A-2-4	1 0	0-7	85-100	75-100	40-85	15-55	0-28	NP-9
	!		!	!	!	!	!	!	!	!		!
	1 10 05			1	!		105 400		1 45 05	105 55		
	1 13-25		SM, SC-SM, SC	A-4, A-2-4	l O	0-7	182-T00	1 \2-T00	145-85	125-55	117-28	1 2-10
	1 25 20	•	I CC CM CC	1 7 7 7 4	1 0	1 0 7	105 100	I 175 100	  40 0F	115 55	110 20	1 4 10
	1 25-32		ISC-SM, SC	A-4, A-2-4	1 0	1 0-7	192-100	1 12-100	40-85 	1 12-22	1 1 2 - 3 0	4-12
	1 33-00	· -	 	l 	 	   <b>-</b>	   ===	   ===	   <b></b> -	I =	   ===	   ===
	32-00 	I onweathered bedrock	 	 								
1702608: Abbaye	2-4   4-13     13-25   25-32	plant material	      SM, SC-SM, SC	  A-8    A-2-4  A-4, A-2-4    A-4, A-2-4    A-4, A-2-4   		•	   100   185-100   85-100   1   85-100   85-100   1	  75-100  75-100 	40-85        45-85	15-55        25-55	0-2      17-2	8

Table 14.-Engineering Properties-Continued

34		T077 1 - 1 - 1	Classi	fication	Frag	ments	Po	ercenta		-	17	
Map unit symbol	. Deptn	USDA texture	!		1 10		<u>!</u>	sieve	number-	<del>-</del>	Liquid	
and soil name	!			1 3300000	>10	3-10	•	1 10	1 40	1 200	limit	
	<u>!</u>	<u> </u>	Unified	AASHTO	in	in	4	1 10	1 40	1 200	<del></del>	lindex
	I In		I	1	Pct	Pct	I	I	I	I	Pct	I
	I	I	1	1	l	1	I	I	I	1	1	I
1711685:	I	I	1	1	l	1	l	I	l	1	1	I
Cublake	0-3	Sand	SP-SM, SM	A-3, A-2-4,	1 0	1 0	80-100	75-100	40-70	5-15	0-25	NP-4
	I	I	1	A-1-b	l	1	I	I	I	1	1	I
	3-4	Sand, loamy sand, loamy	SP-SM, SM	A-3, A-4,	1 0	1 0	80-100	75-100	40-80	5-45	0-24	NP-6
	I	fine sand, fine sand	1	A-1-b, A-2-4		1	I	I	I	1	1	I
	4-23		SP-SM, SM	A-3, A-4,	1 0	0	80-100	75-100	40-80	5-45	0-29	NP-6
	I	sand, loamy fine sand	1	A-1-b, A-2-4		1	I	1	1	1	1	1
	23-32		SP-SM, SM	A-3, A-4,	0	0	80-100	75-100	40-80	5-45	0-23	NP-6
	I	sand, loamy fine sand	1	A-1-b, A-2-4	l	1	1	1	1	1	1	1
	32-40	Sand, fine sand	SP-SM, SM	A-3, A-2-4,	0	0	80-100	75-100	40-80	5-35	0-19	NP-2
	I	1	1	A-1-b	l	1	I	1	1	1	1	1
	40-48	Stratified fine sand to	SP-SM, SM	A-3, A-2-4,	0	0	80-100	75-100	40-80	5-35	0-19	NP-2
	I	very fine sand	1	A-1-b	I	1	I	1	1	1	1	1
	48-60	Stratified very fine	SC, SC-SM,	A-6, A-4	0	0	95-100	90-100	75-95	45-85	20-32	6-13
	!	sandy loam to silt loam	CL, CL-ML	!	!	!	!	!	!	!	1	!
Keweenaw	l I 0-2	  Loamy sand	  SM, SC-SM, SC	 ! a-2-4 a-2	I I 0-2	I I 0-20	I I 90-100	  75-100	I I40-75	I 115-30	   0-20	  NP-10
		Gravelly loamy fine	SM, SC-SM, SC		1 0						0-20	
		sand, cobbly loamy	1	A-1-b	,	1	1	1	1	1	1 0 =0	1
	i	sand, sandy loam,	i	1		i		i	i	i	i	i
	i	loamy sand	i	i		i		i	i	i	i	i
	'   4-16	• -	SM, SC-SM, SC	' '  A-2-4	i 0	1 0-25	185-100	' 165-100	145-75	'  15-35	0-20	י ואדף–10
	1	loamy sand, sandy	1	A-1-b, A-2		1 0 23	1	1	1	1	1 0 20	1
	i	loam, cobbly loamy	i	1 1 2 2 7 11 2		i		i	i	i	i	i
	;	fine sand	i	i		<u> </u>		i	i	i	i .	i
	I I 16-20	Loamy sand, cobbly	SM, SP-SM,	  A-1-b, A-2	i I 0	1 0-25	1 185-100	1 165-100	1 145-75	1110-25	0-20	י ואדס – 1 ∩
	1 10 20		SC, SC-SM	1		1 0 23	1	100 100	1 23 73	1	1 0 20	1
	! !	gravelly loamy sand,	I SC, SC SM		! !		! !	<u> </u>				
	! !	sand	1		! !		! !	<u> </u>				
	I I 20-27	Loamy sand, cobbly	SM, SP-SM,	  A-2-4, A-2,	I 0	1 0-25	I I 0 5 _ 1 0 0	I 165_100	1 45 - 75	110-25	1 0-23	INTD_10
	20-27		SC, SC-SM	A-1-b		1 0-23	102-100	102-100	143-73	110-23	1 0-23	INF-IO
	!	fine sand	I SC, SC-SM	M-1-D	! !	!	! !	1	!	:	:	!
	1 27 42	•	SM, SP-SM,	  A-2, A-2-4,	I 0	1 0 25	  85-100	I I 6	140 00	1 5 20	1 0-27	INTO 10
		· · ·				1 0-25	102-100	102-100	140-60	1 5-20	1 0-27	IND-IO
	!	. , , ,	SC, SC-SM	A-3, A-1-b	!	!	1	1	!	!	!	!
	   42 7 F	fine sand, sandy loam	I CM CC CM CC	1 2 4 3 2	I ^	1 0 05	I 10E 100	I I 6	145 00	110 20	1 0 20	INTO 10
	1 43-75	Loamy sand, sandy loam,	ISM, SC-SM, SC		0	1 0-25	192-100	102-100	145-80	110-30	0-30	IND-TO
	!	gravelly loamy fine	1	A-1-b	!	!	!	1	!	!	!	!
		sand, fine sandy loam		1	I	1	105 466	1	1	1 0 0-	1	1
	75-80 	Loamy sand, gravelly	SM, SP-SM,	A-2-4, A-2,	I 0	0-25	185-100	165-100	145-75	110-25	0-20	NP-10
	I	loamy sand, cobbly sand	I SC SC-SM	A-1-b	1	1	1	1	1	1	1	1

Table 15.-Physical Soil Properties

(Sand, silt, and clay values are shown either as a range or as a representative value (rv). Absence of an entry indicates that data were not estimated. Soil properties are measured or inferred from direct observations in the field or laboratory)

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name		1 1			bulk	(Ksat)	water	swell	matter
	<u> </u>	<u>                                     </u>		<u> </u>	density	<u> </u>	capacity	potential	
	In	Pct	Pct	Pct	g/cc	<u>In/hr</u>	<u>In/in</u>	Pct	Pct
		!!!				!		!!!	
433292:		!						!!!	
Lerch	0-3	0-0	0-0		0.15-0.40		0.35-0.45		65-85
	3-7	10	0-35		1.25-1.35			9.0-12.0	1.0-3.0
	7-12		0-60		1.25-1.50			9.0-12.0	0.0-1.0
	12-29		0-60		1.25-1.50			9.0-12.0	0.0-0.5
	29-56		0-60		1.25-1.50			9.0-12.0	0.0-0.5
	56-80	0-80	5-80	5-25	1.45-1.65	0.6-20.0	0.08-0.22	0.0-2.9	0.0-0.5
Herbster	I 0-5	I 27 I	54	I 10-27	1.35-1.55	I 0.6-2.0 I	0.17-0.22	1 0.0-2.9	1.0-3.0
	5-10	I 16 i	30-70		1.45-1.60			1 0.0-2.9 1	0.5-1.0
j	10-13	5-40	30-70		1.45-1.60		0.09-0.20	1 6.0-8.9 1	0.5-1.0
j	13-28		29		1.45-1.60			I 6.0-8.9 I	0.5-1.0
j	28-33	I 5-35 I	20-65		1.40-1.65		0.09-0.13	1 6.0-8.9 1	0.0-0.5
,	33-55		20-65		1.40-1.65	•		I 6.0-8.9 I	0.0-0.5
Ì	55-80	20-80	10-65		1.45-1.70		0.10-0.16	0.0-2.9	0.0-0.5
						l I		1 1	
433296:		1 1				l I		1 1	
Cublake	0-3	95	1	0-8	1.35-1.60			0.0-2.9	0.5-2.0
	3-4	80-95	1	0-10	1.35-1.65	2.0-20.0	0.05-0.12	0.0-2.9	0.0-1.0
	_	80-95	2	1-10	1.40-1.70	2.0-20.0	0.05-0.08	0.0-2.9	1.0-3.0
	23-32		2	1-10	1.45-1.70	2.0-20.0	0.04-0.11	0.0-2.9	0.0-0.5
	32-40		2		1.45-1.70	2.0-20.0	0.04-0.11	0.0-2.9	0.0-0.5
	40-48	90-100	0-10	0-5	1.45-1.70	2.0-20.0	0.04-0.11	0.0-2.9	0.0-0.5
	48-60	20-70	5-70	10-20	1.40-1.80	0.2-2.0	0.12-0.18	0.0-2.9	0.0-0.5
Croswell	   0-1	   75-100	6	l 0-101	1.35-1.65		0 06-0 11	1 0.0-2.9	1.0-3.0
0105#011	1-7	75-100			1.30-1.50			0.0-2.9	0.5-2.0
	7-16				1.40-1.60			0.0-2.9	0.6-1.0
	16-39				1.40-1.60		0.05-0.10		0.0-0.5
	39-60		2		1.50-1.65			0.0-2.9	0.0-0.5
İ		i i		İ		i i		i i	
Ashwabay	0-4	85	9	2-10	1.35-1.65	6.0-20.0	0.09-0.12	0.0-2.9	2.0-4.0
_	4-5	80-100	2	1-4	1.35-1.65	6.0-20.0	0.09-0.12	0.0-2.9	0.5-1.0
j	5-12	80-100	2	1-4	1.45-1.70	6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
i	12-32	80-100	2	1-4 i	1.45-1.70	6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
Ĭ	32-45		2		1.55-1.70			0.0-2.9	0.5-1.0
	45-62		25-60		1.45-1.55			1 6.0-8.9	
	62-80		5-85		1.45-1.55		0.08-0.12		0.0-0.5
Ï		i				i i		i i	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name					bulk	(Ksat)	water	swell	matter
<u> </u>		<u>                                     </u>		<u> </u>	density	<u> </u>	capacity	potential	
I	In	Pct	Pct	<u>Pct</u>	g/cc	<u>In/hr</u>	<u>In/in</u>	Pct	Pct
I		1 1		l I		l l		1 1	
433299:		1 1		l I		l I		1 1	
Cublake	0-3	95	1		1.35-1.60	2.0-20.0	0.05-0.09		0.5-2.0
I	3-4	80-95	1		1.35-1.65	2.0-20.0	0.05-0.12		0.0-1.0
I	4-23		2	1-10	1.40-1.70	2.0-20.0	0.05-0.08	0.0-2.9	1.0-3.0
I	23-32		2		1.45-1.70		0.04-0.11		0.0-0.5
I	32-40	96	2		1.45-1.70	2.0-20.0	0.04-0.11		0.0-0.5
I	40-48				1.45-1.70		0.04-0.11		0.0-0.5
I	48-60	20-70	5-80	10-20	1.40-1.80	0.2-2.0	0.12-0.18	0.0-2.9	0.0-0.5
I		II				l		1	
Croswell	0-1	75-100			1.35-1.65			0.0-2.9	1.0-3.0
I	1-7	75-100			1.30-1.50		0.06-0.11		0.5-2.0
I	7-16				1.40-1.60		0.06-0.11		0.6-1.0
I	16-39	75-100	0-20		1.40-1.60			0.0-2.9	0.0-0.5
ı	39-60	96	2	0-5	1.50-1.65	6.0-20.0	0.05-0.07	0.0-2.9	0.0-0.5
!						! !		! !	
Ashwabay		85	9		1.35-1.65		0.09-0.12		2.0-4.0
ı		80-100			1.35-1.65		0.09-0.12		0.5-1.0
I	5-12				1.45-1.70		0.05-0.11		0.5-1.0
I	12-32		2	1-4	1.45-1.70	6.0-20.0	0.05-0.11		0.5-1.0
ı	32-45	97	2	1-2	1.55-1.70	6.0-20.0	0.04-0.08		0.5-1.0
ı	45-62	10-40	25-60	35-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
!	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
433300: I								!!!	
Kellogg	0-2	I 0-0 I		I 1	0.15-0.30	ı 6.0-20.0 I	0.55-0.65		65-85
Reliogg	2-6	1 0-0 1 1 94 1	1		1.35-1.60			0.0-2.9	
:	6-26		2		1.35-1.60			0.0-2.9	0.6-1.0 0.6-1.0
:									
!	26-29	5-35	20-60		1.50-1.70		0.09-0.17		0.0-0.5
!	29-40	5-35	20-60		1.50-1.70		0.09-0.17	6.0-8.9	0.0-0.5
	40-80	5-35	20-60	30-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
Allendale	0-3	ı 79 i	16	I I I 0-10I	1.25-1.40		0.09-0.12	0.0-2.9	2.0-4.0
HITCHGGIE	3-10		2		1.35-1.45	6.0-20.0 I	0.06-0.10		0.5-1.0
;	10-13		1		1.35-1.45			0.0-2.9	0.0-0.5
;	13-26		1		1.35-1.45		0.06-0.10		0.0-0.5
:	26-28		1				0.06-0.10		0.0-0.5
:	28-34				1.35-1.45				
!					1.45-1.70			6.0-8.9	0.0-0.5
<u>'</u>	34-60	15-25	25-45	40-60  	1.45-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
Ashwabay	0-4	ı 85 I	9	I 2-10I	1.35-1.65	6.0-20.0	0.09-0.12	1 0.0-2.9	2.0-4.0
	4-5	80-100			1.35-1.65	6.0-20.0 I	0.09-0.12	1 0.0-2.9 1	0.5-1.0
· ·	5-12		2		1.45-1.70		0.05-0.11		0.5-1.0
 	12-32						0.05-0.11		0.5-1.0
!					1.45-1.70				
!	32-45		2 50		1.55-1.70		0.04-0.08		0.5-1.0
!	45-62		25-60		1.45-1.55	0.1-0.2	0.08-0.12		0.0-0.5
ļ	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
				ı I		ı I		1 1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name		l I			bulk	(Ksat)	water	swell	matter
		<u>                                     </u>		<u> </u>	density	<u> </u>	capacity	potential	
	<u>In</u>	<u>Pct</u>	Pct	<u>Pct</u>	g/cc	<u>In/hr</u>	<u>In/in</u>	Pct	Pct
		l I				l I		1 1	
433301:		1				I I		1 1	
Kellogg      	0-2	1 0-0 1			0.15-0.30		0.55-0.65		65-85
	2-6	94	1		1.35-1.60			0.0-2.9	0.6-1.0
	6-26		2		1.35-1.60		0.06-0.10	0.0-2.9	0.6-1.0
	26-29		20-60		1.50-1.70			6.0-8.9	0.0-0.5
	29-40	5-35			1.50-1.70			6.0-8.9	0.0-0.5
ļ	40-80	5-35	20-60	30-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
Allendale	   0-3	I 19 I	16	   0_10	1.25-1.40		0 00-0 12	1 0.0-2.9 1	2.0-4.0
	3-10		2		1.35-1.45		0.09-0.12		0.5-1.0
	10-13				1.35-1.45		0.06-0.10		0.0-0.5
	13-26		1		1.35-1.45		0.06-0.10		0.0-0.5
		80-95     80-95			1.35-1.45		0.06-0.10		0.0-0.5
			25-45		1.45-1.70			1 6.0-8.9 1	0.0-0.5
		15-25     15-25			1.45-1.70		0.08-0.12		0.0-0.5
	34-00 	15-25   	25-45	<del>4</del> 0-60	1.45-1.70	0.0-0.1   	0.08-0.12	1 0.0-0.9 1	0.0-0.5
Ashwabay              	0-4	' 85 I	9	' 2-10	1.35-1.65	   6.0-20.0	0.09-0.12	0.0-2.9	2.0-4.0
	4-5	80-100	2	1-4	1.35-1.65	6.0-20.0 I	0.09-0.12	1 0.0-2.9 1	0.5-1.0
	5-12	80-100	2	1-4	1.45-1.70	6.0-20.0 I	0.05-0.11	1 0.0-2.9 1	0.5-1.0
	12-32	80-100	2	1-4	1.45-1.70	6.0-20.0 I	0.05-0.11	1 0.0-2.9 1	0.5-1.0
	32-45	I 97 I	2	1-2	1.55-1.70	6.0-20.0 I	0.04-0.08	1 0.0-2.9 1	0.5-1.0
	45-62	10-40	25-60	35-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
		!!!				!!!		!!!	
433304:		! !							
Sedgwick            		67	20		1.35-1.65		0.10-0.15		2.0-4.0
	5-8	82	9		1.45-1.70		0.08-0.17		0.5-1.0
	8-16		20		1.40-1.70		0.10-0.17		1.0-2.0
	16-19		20-65		1.40-1.70		0.07-0.16		0.0-0.5
	19-53		25-65		1.45-1.70		0.07-0.16		0.0-0.5
	53-80	5-40	25-65	30-70	1.50-1.80	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
Munuscong      	   0-8	ı 68 I	22	ı 5–151	1.30-1.65	ı 2.0-6.0 I	0.13-0.15	1 0.0-2.9 1	2.0-3.0
	8-30		20		1.30-1.70		0.12-0.17		0.0-0.5
	30-60		20-70		1.35-1.70		0.08-0.18		0.0-0.5
į		l İ		ı i		i i		I İ	
433305:		l I				I I		1 1	
Superior          	0-3	68	21		1.35-1.65		0.12-0.18		1.0-3.0
	3-6	68	23		1.35-1.65		0.12-0.18		0.5-1.0
	6-14		23		1.55-1.65		0.11-0.19		0.5-1.0
	14-19		28		1.60-1.70		0.08-0.13		0.0-0.5
	19-26		28		1.60-1.70		0.08-0.13		0.0-0.5
	26-60	17	28	40-70	1.60-1.70	0.0-0.1	0.07-0.13	6.0-8.9	0.0-0.5
1		l I				l I		1 1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name		l I		l I	bulk	(Ksat)	water	swell	matter
<u>l</u>		lI		ll	density	l <u></u>	capacity	potential	
1	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
1		l I				l I		1 1	
433305: I	_	l I	_			l		1	
Sedgwick	0-5	82	9		1.35-1.65		0.10-0.15		2.0-4.0
ı	5-8		9		1.45-1.70		0.08-0.17		0.5-1.0
1	8-16		20		1.40-1.70			0.0-2.9	1.0-2.0
1	16-19		20-65		1.40-1.70			6.0-8.9	0.0-0.5
1	19-53		25-65		1.45-1.70			6.0-8.9	0.0-0.5
!	53-80	5-40	25-65	30-70	1.50-1.80	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
ا 433309: ا		 		 				; ;	
Superior	0-3	' 68 I	21	7-15	1.35-1.65	0.6-2.0	0.12-0.18	1 0.0-2.9 1	1.0-3.0
Jupoli I	3-6		23		1.35-1.65		0.12-0.18		0.5-1.0
i	6-14		23		1.55-1.65		0.11-0.19		0.5-1.0
i	14-19		28		1.60-1.70			1 6.0-8.9	0.0-0.5
i	19-26		28		1.60-1.70		0.08-0.13		0.0-0.5
i	26-60		28		1.60-1.70			1 6.0-8.9	0.0-0.5
i	20 00	, <u>-</u> , , 	20	, <u>1</u> 0 ,0,	1.00 1.70	0.0 0.1	0.07 0.13	1 1	0.0 0.5
Sedgwick	0-5	82	9	3-15	1.35-1.65	0.6-2.0 i	0.10-0.15	0.0-2.9	2.0-4.0
i	5-8	82	9	3-15	1.45-1.70	0.6-2.0	0.08-0.17	1 0.0-2.9 1	0.5-1.0
i	8-16	I 67 I	20		1.40-1.70		0.10-0.17	1 0.0-2.9 1	1.0-2.0
i	16-19	I 5-60 I	20-65		1.40-1.70		0.07-0.16	1 6.0-8.9 1	0.0-0.5
i	19-53	I 5-40 I	25-65		1.45-1.70		0.07-0.16	1 6.0-8.9 1	0.0-0.5
i	53-80	5-40	25-65	30-70	1.50-1.80	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
100010						!!!		!!!	
433310:	0 0		•		0 15 0 20		0 55 0 65	!!	65.05
Sultz	0-2	0-0	0		0.15-0.30		0.55-0.65		65-85
!		80-100	2		1.40-1.65		0.05-0.11		0.5-1.0
!	6-18		2		1.45-1.70		0.05-0.11		1.0-2.0
!	18-25		2		1.45-1.70			0.0-2.9	0.0-0.5
!	25-43		2		1.50-1.70			0.0-2.9	0.0-0.5
!	43-60	50-90   	5-50	2-20    I	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
Ashwabay	0-4	' 85 I	9	' 2-10	1.35-1.65	6.0-20.0	0.09-0.12	0.0-2.9	2.0-4.0
i	4-5	80-100	2	1-4	1.35-1.65	6.0-20.0 I	0.09-0.12	1 0.0-2.9 1	0.5-1.0
i	5-12	80-100	2	I 1-4 I	1.45-1.70	6.0-20.0 I	0.05-0.11	1 0.0-2.9 1	0.5-1.0
i	12-32		2		1.45-1.70		0.05-0.11		0.5-1.0
i	32-45	I 97 I	2		1.55-1.70		0.04-0.08	1 0.0-2.9 1	0.5-1.0
i	45-62		25-60		1.45-1.55		0.08-0.12		0.0-0.5
i	62-80		5-85		1.45-1.55		0.08-0.12		0.0-0.5
1						l		1	
Rubicon	0-1		2		1.25-1.45			0.0-2.9	0.5-2.0
1	1-6		2		1.30-1.60			0.0-2.9	0.0-0.5
1	6-18	94	1	0-10	1.30-1.60	6.0-20.0	0.04-0.08	0.0-2.9	0.6-1.0
ı									
i	18-36 36-60		1 2		1.30-1.60 1.40-1.65		0.04-0.08	0.0-2.9     0.0-2.9	0.6-1.0 0.0-0.5

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name	2019 0	, <u>Janua</u> ,	5	, o_a, ,	bulk	(Ksat)	water	swell	matter
	i İ	i i		i i	density	i ,,		potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
	<u> </u>	i — i		i — i	<u> </u>	i <del></del> i	<del></del>	i — i	
433314:	i i	i i		i i		i i		i i	
Manistee	I 0-3	I 91 I	2	3-12	1.35-1.60	6.0-20.0	0.10-0.12	0.0-2.9	2.0-4.0
i	3-11	80-95	2		1.35-1.60			0.0-2.9	1.0-2.0
İ	11-28	80-95	2		1.35-1.60		0.06-0.10	0.0-2.9	0.3-0.8
1	28-30	80-95	2	2-12	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.3-0.8
ĺ	30-38	10-40	25-50	35-60	1.50-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
ĺ	38-60	10-40	25-50	35-60	1.60-1.75	0.1-0.2	0.08-0.16	6.0-8.9	0.0-0.5
ĺ	l	I I		l I		l I		1 1	
Kellogg	0-2	I 0-0 I		0-0	0.15-0.30	6.0-20.0	0.55-0.65		60-85
	2-6	94	1	2-8	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.6-1.0
	6-26	80-95	2	2-12	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.6-1.0
	26-29	10-80	5-60	5-55	1.35-1.65	0.0-0.2	0.09-0.15	6.0-9.0	0.0-0.5
	29-40	5-35	20-60	35-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
	40-80	5-35	20-60	30-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
	l	I I		l I		l I		1	
Ashwabay	0-4	85	9		1.35-1.65			0.0-2.9	2.0-4.0
	4-5	80-100		1-4	1.35-1.65	6.0-20.0		0.0-2.9	0.5-1.0
1	5-12				1.45-1.70			0.0-2.9	0.5-1.0
I	12-32	80-100			1.45-1.70			0.0-2.9	0.5-1.0
I	32-45	97	2		1.55-1.70			0.0-2.9	0.5-1.0
I	45-62		25-60		1.45-1.55			6.0-8.9	0.0-0.5
	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
433326:	l i							!!!!	
Rubicon	I I 0-1	ı I 90-98 I	2	I ∩_5 I	1.35-1.70	ı	0 07-0 09		0.5-2.0
Rubicon	1 1-6	90 98     90-98	2	I 0-5 I				1 0.0-2.9 1	0.0-0.5
	1 0   6-18		2		1.60-1.70			0.0-2.9	0.0-0.5
	18-36		2	05    0-5				0.0-2.9	0.0-0.5
	36-60		2	0 5 1 1 0-5 1			0.02-0.07		0.0-0.5
	1	1 1	_	,	1.00 1.00	, 0.0 <u>2</u> 0.0 ,	0.02 0.07	1 0.0 2.5 1	0.0 0.5
433379:	i	i i		i		iiii		i i	
Allendale	I 0-3	I 79 I	16	0-10	1.25-1.40	6.0-20.0	0.09-0.12	0.0-2.9	2.0-4.0
	3-10	I 70-95 I	2		1.35-1.45			0.0-2.9	0.5-1.0
j	10-13	I 80-95 I	1		1.35-1.45			1 0.0-2.9 1	0.0-0.5
	13-26	I 80-95 I	1	0-10	1.35-1.45	6.0-20.0	0.06-0.10	1 0.0-2.9 1	0.0-0.5
	26-28	I 80-95 I	1		1.35-1.45		0.06-0.10	1 0.0-2.9 1	0.0-0.5
i	28-34	15-25	25-45	40-60 i	1.45-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
i	34-60	15-25	25-45	40-60	1.45-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
	l	1 1		l I		1		1 1	
433515:	l	I I		l I		l I		1 1	
Lupton	0-65	0-0	0-0	0-0	0.15-0.40	0.2-6.0	0.35-0.45	I İ	30-80
	l					l I		1 1	
Cathro	0-28	I 0-0 I	0	0-0	0.28-0.45	0.2-6.0	0.35-0.45		60-85
	28-49	15-70	10-55	10-30	1.50-1.70	0.2-2.0	0.11-0.22	0.0-2.9	0.0-0.5
	49-60	15-70	10-55	10-30	1.50-1.70	0.2-2.0	0.11-0.22	0.0-2.9	0.0-0.5
	l			l I		1		1	
Tawas	0-31	I 0-0 I	0-0	0-0			0.35-0.45		30-80
	31-60	75-100	2-20	0-10	1.55-1.80	6.0-20.0	0.02-0.10	0.0-2.9	0.0-0.5
	l	1 1		l I		1		1 1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available		Organic
and soil name		! !			bulk	(Ksat)	water	swell	matter
		<u>                                     </u>		<u> </u>	density	<u>  </u>	capacity	potential	
l	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
422570		! !				!!!		!!!	
433572:     Portwing	0-4	I 1 I 27 I	54		1.35-1.55	I 0.6-2.0 I	0 17 0 22	1 0.0-2.9	1.0-3.0
POFCWING	4-9		20-70		1.45-1.60			1 0.0-2.9	0.5-1.0
	9-32		20-70		1.40-1.55			1 6.0-8.9	0.0-1.0
			20-60		1.40-1.55			1 6.0-8.9	0.0-1.0
	51-80	15-40     15-90			1.45-1.70		0.10-0.15		0.0-1.0
	31 00	l 13 90 1	10 03	l 3 131	1.45 1.70	0.0 <u>2.</u> 0	0.10 0.15	1 0.0 2.9 1	0.0 0.5
Herbster	0-5	27	54	10-27	1.35-1.55	0.6-2.0	0.17-0.22	0.0-2.9	1.0-3.0
į	5-10	16	30-70	15-45	1.45-1.60	0.2-2.0	0.12-0.20	0.0-2.9	0.5-1.0
1	10-13	5-40	30-70	25-60	1.45-1.60	0.0-0.6	0.09-0.20	6.0-8.9	0.5-1.0
1	13-28	23	29	35-60	1.45-1.60	0.0-0.1	0.09-0.13	6.0-8.9	0.5-1.0
į	28-33	18	20-65	35-60	1.40-1.65	0.0-0.1	0.09-0.13	6.0-8.9	0.0-0.5
	33-55	18	20-65	35-60	1.40-1.65	0.0-0.1	0.09-0.13	6.0-8.9	0.0-0.5
1	55-80	20-80	10-65	5-20	1.45-1.70	0.6-2.0	0.10-0.16	0.0-2.9	0.0-0.5
		l I		l I		l I		1 1	
433573:		! !							
Cornucopia	0-3	27	54		1.35-1.55			0.0-2.9	1.0-3.0
	3-10		15-65		1.45-1.60			0.0-2.9	0.5-1.0
	10-32		20-50		1.40-1.55			6.0-8.9	0.0-1.0
			20-50		1.40-1.55			6.0-8.9	0.0-1.0
	45-50		10-85		1.45-1.70			0.0-2.9	0.0-0.5
	50-72	15-90	10-85	5-15	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
433582 :		' ' 				; ;		; ;	
Croswell	0-1	I 92 I	6	0-10	1.35-1.65	6.0-20.0	0.07-0.09	1 0.0-2.9 1	1.0-3.0
	1-7	75-100	0-20	0-10	1.30-1.70		0.07-0.09	1 0.0-2.9 1	0.5-2.0
	7-16	75-100	0-20	0-10	1.55-1.70	6.0-20.0 i	0.06-0.08	1 0.0-2.9 1	0.6-1.0
i	16-39	75-100	0-20	0-10	1.55-1.70	6.0-20.0 j	0.05-0.08	0.0-2.9	0.0-0.5
i	39-60	96	2	0-5	1.60-1.70	6.0-20.0	0.05-0.07	0.0-2.9	0.0-0.5
						!		! !	
433599:	0.0		00		1 05 1 60		0 16 0 10		1 0 2 0
Annalake	0-3	68	22		1.25-1.60			0.0-2.9	1.0-3.0
	3-6		10-40		1.30-1.60			0.0-2.9	0.5-1.0
	6-17		22		1.45-1.60		0.13-0.22		0.5-1.0
	17-31 31-39	40-75     40-75	10-40 10-40		1.45-1.60		0.12-0.19	0.0-2.9     0.0-2.9	0.0-0.5 0.0-0.5
	31-39	40-75     40-90	5-55		1.45-1.60				
ا 433600:	39-60	40-90	5-55	2-12	1.45-1.70	0.6-2.0	0.05-0.22	0.0-2.9	0.0-0.5
433600:   Annalake	0-3	1 60 I	22	 	1.25-1.60	I 0.6-2.0 I	0 16-0 10	1 0.0-2.9	1.0-3.0
линатаке	3-6	68     40-75	10-40						
	3-6 6-17				1.30-1.60		0.13-0.22		0.5-1.0 0.5-1.0
	17-31		22 10-40		1.45-1.60		0.13-0.22 0.12-0.19		
	31-31	40-75     40-75	10-40		1.45-1.60		0.12-0.19		0.0-0.5 0.0-0.5
	31-39		5-55		1.45-1.60 1.45-1.70		0.12-0.19		0.0-0.5
	39-60	40-90   	5-55	2-T2	1.45-1.70	1 0.0-2.0	0.05-0.22	1 0.0-2.9	0.0-0.5
		ı l		ı I		ı I		1 1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name	_ 	ı i		i	bulk	(Ksat)	water	swell	matter
		I I		I	density	l l	capacity	potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
		!!!		ļ		! !		!!!	
433671:				10 10	4 4 5 4 60		0 10 0 05		0 0 15
Arnheim	0-5	] 30	55		1.15-1.60			0.0-2.9	3.0-15
	5-10	] 30	55		1.50-1.80			0.0-2.9	0.5-2.0
	10-15		5-80		1.50-1.80		0.14-0.22		0.5-2.0
	15-24	0-80	5-80		1.50-1.80		0.14-0.22		0.5-2.0
	24-60 	50-85   	5-30	2-12	1.50-1.80	0.6-2.0   	0.14-0.22	0.0-2.9	0.0-1.0
433676:		i i		i		, 		i i	
Redrim	0-1	I 0-0 I	0-0	0-0	0.15-0.30	6.0-20.0	0.55-0.65		65-85
I	1-3	I 0-0 I	0-0	0-0	0.15-0.30	6.0-20.0	0.55-0.65		65-85
1	3-11	97	2	1-2	1.35-1.60	20.0-20.0	0.03-0.08	0.0-2.9	0.5-2.0
I	11-18	75-95	0-20	2-5	1.50-1.70	20.0-20.0	0.02-0.10	0.0-2.9	0.0-0.5
	18-80					0.2-2.0			0.0-0.0
433679:	]	 				 		!!!	
Lapoin	0-1	ı 0-0 I		0-0 I	0.15-0.30	ı 6.0-20.0 I	0.55-0.65	: :	65-85
паротп	1-4	1 44 1	40		1.35-1.55	1 0.6-2.0 I	0.18-0.22		2.0-8.0
	1 4-7	I 30-80 I	5-50		1.40-1.65		0.12-0.19	1 3.0-5.9 I	1.0-3.0
	7-19	50 00     5-45	20-60		1.35-1.60	0.0 2.0     0.1-0.6	0.10-0.18	6.0-8.9	0.0-0.5
	19-34	1 5-40 I	20-60		1.35-1.50			6.0-8.9	0.0-0.5
	34-39	1 67 I	23		1.40-1.70	0.6-2.0 I	0.10-0.17		0.0-0.5
	39-80	,				0.2-2.0	0.00-0.00		0.0-0.0
433686:								!!!	
Zeba	   0-2	ı 1 I 78 I	12		1.30-1.70	ı	0.13-0.15	1 0 0 2 0 1	2.0-4.0
Zeba	0-2   2-5	ı 76 i I 69 i	24		1.40-1.80	0.6-2.0     0.6-2.0	0.13-0.13		0.0-0.5
	5-13		29		1.40-1.80		0.09-0.17		0.0-0.5
	13-13	l 55-85 l	21		1.40-1.80	0.6-2.0     0.6-2.0	0.09-0.17	0.0-2.9	0.0-0.5
	21-33	33-63     68	24		1.40-1.80	0.6-2.0     0.6-2.0	0.09-0.17	1 0.0-2.9 1	0.0-0.5
	33-80	00   		<del></del>		0.02.0	0.09-0.13		0.0-0.5
į	Ì	i i	İ	i		İ		i i	
433729:		l I		l I		l l		1 1	
Sultz	0-2	I 0-0 I	0-0	0-0		6.0-20.0	0.55-0.65		65-85
I	2-6	80-100		1-5		6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
I	6-18	80-100			1.45-1.70	6.0-20.0	0.05-0.11		1.0-2.0
I	18-25		2		1.45-1.70		0.05-0.11		0.0-0.5
	25-43	96	2		1.50-1.70	6.0-20.0	0.04-0.07	0.0-2.9	0.0-0.5
	43-60	50-90	5-50	2-20	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
433739:	] 	, l   l				· ! 		; ;	
Moquah	0-5	71	17	10-15	1.40-1.70	0.6-2.0	0.13-0.22	0.0-2.9	2.0-3.0
-	5-19	10-90	5-80		1.55-1.70	0.2-2.0		0.0-2.9	0.5-1.0
	19-48	10-90	5-80		1.55-1.70		0.12-0.22	0.0-2.9	0.5-1.0
j	48-55	30	55	12-18	1.50-1.80	0.6-2.0	0.20-0.22	0.0-2.9	0.5-2.0
j	55-60	95	2	0-6 j	1.60-1.75	0.6-2.0	0.05-0.07	0.0-2.9	0.5-1.0
į		ı İ	Ì	į		İ		I İ	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available		Organic
and soil name		1 1		l I	bulk	(Ksat)	water	swell	matter
<u> </u>		<u>                                     </u>	<u> </u>	<u> </u>	density	<u> </u>	capacity	potential	
I	In	<u>Pct</u>	Pct	<u>Pct</u>	g/cc	In/hr	<u>In/in</u>	Pct	Pct
I				l I		1		1 1	
452765:				l I		1		1 1	
Abbaye	0-2	0-0			0.15-0.30		0.55-0.65		65-85
ı	2-4	82	5		1.30-1.65			0.0-2.9	1.0-3.0
ı	4-13		10		1.30-1.65		0.09-0.12		0.5-1.0
ı	13-25		23		1.35-1.65			0.0-2.9	0.5-1.0
ı	25-32		20	8-18	1.35-1.70		0.08-0.14	0-2.9	0.0-0.5
!	32-80					0.2-2.0			0.0-0.0
Lapoin	0-1	I 0-0 I		ı ı   0-0	0.15-0.30		0.55-0.65		65-85
	1-4	44	40	12-20	1.35-1.55	0.6-2.0	0.18-0.22	0.0-2.9	2.0-8.0
ı	4-7	30-80	5-50	10-25	1.40-1.65	0.6-2.0	0.12-0.19	3.0-5.9	1.0-3.0
ı	7-19	5-45	20-60	25-60	1.35-1.60	0.1-0.6	0.10-0.18	6.0-8.9	0.0-0.5
i	19-34	5-40	20-60	35-60	1.35-1.50	0.1-0.2	0.08-0.15	6.0-8.9	0.0-0.5
ı	34-39	67	23	5-15	1.40-1.70	0.6-2.0	0.10-0.17	0.0-2.9	0.0-0.5
İ	39-80	i i		i i		0.2-2.0	0.00-0.00	i i	0.0-0.0
ا 1383557: ا		 		 					
Au Gres	0-2	i 0-0 i	0-0	i 0-0 i	0.15-0.30	0.6-2.0	0.35-0.45	i i	65-85
1	2-5	75-100			1.50-1.70			0.0-2.9	0.6-1.0
i	5-8	75-100			1.50-1.70			0.0-2.9	0.6-1.0
i	8-16				1.50-1.70		0.06-0.11		0.6-1.0
i	16-28	90-100			1.50-1.70			1 0.0-2.9 1	0.6-1.0
i	28-60		2		1.50-1.70		0.05-0.07		0.0-0.5
		!!!				!!!		!!!	
1383580:     Loxlev	0-13	I 0-0 I	0		0.30-0.40		0.55-0.65		70-90
roxieA	13-60	1 0-0 1 1 0-0 1	0		0.10-0.35		0.35-0.45		70-90
	13-60	1 0-0 I	0	U-U	0.10-0.33	0.2-6.0   	0.35-0.45		70-90
Beseman	0-36	I 0-0 I	0	, , 0-0 i	0.10-0.25	0.6-6.0	0.35-0.45	: i	25-75
	36-60		-		1.35-1.60		0.09-0.22		0.5-1.0
_ !					0 15 0 00		0 55 0 65	!!!	<b>65.05</b>
Dawson	0-8	0-0			0.15-0.30		0.55-0.65		65-85
	8-38				0.15-0.40		0.35-0.45		65-85
	38-40		57		1.55-1.75		0.18-0.20		5.0-15
!	40-60	94   	1	0-10  	1.55-1.75	6.0-20.0   	0.03-0.07	0.0-2.9	0.0-0.5
1383581:				i i		i i		i i	
Rifle	0-4	I 0-0 I	0	I 0-0 I	0.20-0.35	2.0-6.0	0.55-0.65		70-90
	4-60	I 0-0 I	0		0.08-0.20	2.0-6.0	0.45-0.55	I I	70-90

Table 15.-Physical Soil Properties-Continued

Man mail and 1	Dan Hi		0:14	01 '	Maiak	l Danmashilit I	7:1-b7:	l Charles !	0
Map unit symbol	Depth	Sand	Silt	Clay		Permeability			Organic
and soil name		!!!			bulk	(Ksat)	water	swell    potential	matter
	T	<u>                                     </u>		Det I	density	l In/hr l	<del></del>	<del>`-</del>	
	In In	Pct	Pct	Pct	g/cc	i in/nr i	<u>In/in</u>	Pct	Pct
		!!!		!				!!!	
1383603:				10 05	4 05 4 55		0 15 0 00		
Cornucopia		27	54		1.35-1.55			0.0-2.9	1.0-3.0
			15-65		1.45-1.60			0.0-2.9	0.5-1.0
	10-32		20-50		1.40-1.55			6.0-8.9	0.0-1.0
		10-40     15-90			1.40-1.55 1.45-1.70			6.0-8.9     0.0-2.9	0.0-1.0 0.0-0.5
			10-85		1.45-1.70			0.0-2.9     0.0-2.9	0.0-0.5
	1 30-72	1 13-90	10-65	1 2-13	1.45-1.70	0.0-2.0   	0.10-0.15	1 0.0-2.9 1	0.0-0.5
1383658:	! !	! ! ! !							
Deerton	   0-1	ı 0-0 I	;	, n=0 i	0.15-0.30	ı 6.0-20.0 I	0.55-0.65	!	65-85
Deel con	1-9	l 92 l	2		1.30-1.60			   0.0-2.9	0.5-2.0
	9-10		9 1		1.30-1.60			1 0.0 2.9 1	0.1-1.0
	10-25		2		1.30-1.60		0.05-0.10		0.1-1.0
	25-39	, <u>, , ,</u> ,		3 IZ  		0.0 20.0     0.2-2.0		0.0 2.3	0.0-0.5
	39-80		i	i		0.2-2.0		: i	0.0-0.0
	1	i i	i	i		,		i i	
Brownstone	0-2	i 0-0 i	i	0-0 i	0.15-0.30	6.0-20.0	0.55-0.65	i i	65-85
	2-12	I 97 I	2		1.55-1.85		0.04-0.09		0.5-2.0
i	12-15	I 80-100	6 i		1.60-1.90		0.03-0.08	1 0.0-2.9 1	2.0-3.0
	15-23	80-100	2	2-5 I	1.60-1.90	6.0-20.0	0.03-0.08	0.0-2.9	1.0-2.0
i	23-33	80-100	6	2-5 i	1.60-1.90	6.0-20.0	0.03-0.06	0.0-2.9	0.0-0.5
i	33-80	i i	i	i i		0.2-2.0		i i	0.0-0.0
i	l	i i	ĺ	ı i		i i		i i	
1383660:	l	l I	1	ı <b>ı</b>		l l		1 1	
Deerton	0-1	0-0		0-0	0.15-0.30	6.0-20.0	0.55-0.65		65-85
1	1-9	92	2	2-10	1.30-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.5-2.0
I	9-10	84	9	3-12	1.30-1.60	6.0-20.0	0.05-0.10	0.0-2.9	0.1-1.0
	10-25	91	2	3-12	1.30-1.60	6.0-20.0	0.05-0.10	0.0-2.9	0.1-1.0
1	25-39					0.2-2.0			0.0-0.5
I	39-80					0.2-2.0			0.0-0.0
		l I	I	l 1		l l		1 1	
Brownstone		0-0			0.15-0.30		0.55-0.65		65-85
I	2-12		2		1.55-1.85		0.04-0.09		0.5-2.0
		80-100			1.60-1.90			0.0-2.9	2.0-3.0
		80-100			1.60-1.90			0.0-2.9	1.0-2.0
	23-33				1.60-1.90		0.03-0.06		0.0-0.5
	33-80					0.2-2.0			0.0-0.0
1202660		  -		. !		 		!!!	
1383662:		ı , , , ,			0 15 0 00		0 FF 0 CF	! !	CE 05
Abbaye	0-2	0-0			0.15-0.30		0.55-0.65		65-85
	2-4	82	9		1.30-1.65		0.09-0.12		1.0-3.0
	4-13		10		1.30-1.65			0.0-2.9	0.5-1.0
	13-25   25-32		23   20		1.35-1.65 1.35-1.70			0.0-2.9     0.0-2.9	0.5-1.0
	25-32   32-80		I	   8-T8		0.6-2.0     0.2-2.0	0.08-0.14	0.0-2.9   	0.0-0.5 0.0-0.0
	JZ-0U	 			<b>-</b>	U.Z-Z.U   	- <b></b>	,	0.0-0.0
	ı	ı I		ı 1		ı			

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name		1 1		l I	bulk	(Ksat)	water	swell	matter
l l	l	1 1		<u> </u>	density	<u> </u>	capacity	potential	
	<u>In</u>	Pct	Pct	Pct	g/cc	In/hr	<u>In/in</u>	Pct	Pct
   1383665:				 					
Allendale	0-3	i 79 i	16	0-10	1.25-1.40	6.0-20.0	0.09-0.12	1 0.0-2.9	2.0-4.0
		i 70-95 i	2		1.35-1.45			1 0.0-2.9 1	0.5-1.0
i		80-95	1		1.35-1.45			1 0.0-2.9 1	0.0-0.5
		i 80-95 i	1		1.35-1.45			1 0.0-2.9 1	0.0-0.5
i		i 80-95 i	1		1.35-1.45			1 0.0-2.9 1	0.0-0.5
i			25-45		1.45-1.70			1 6.0-8.9 1	0.0-0.5
i	34-60		25-45		1.45-1.70			6.0-8.9	0.0-0.5
  Wakeley	   0-4	I I I			0.10-0.35		0.35-0.45		20-70
wakerey	0-4   4-23		5-20		1.40-1.55		0.35-0.45		0.3-0.8
	23-28		5-20		1.40-1.55			1 0.0-2.9	0.3-0.8
	28-80		20-60		1.50-1.70		0.08-0.11		0.0-0.5
	20-00	l 10-30	20-00	40-60    I	1.50-1.70	0.0-0.2   	0.08-0.12	1 0.0-0.9 1	0.0-0.5
Kinross	0-6	0-0		0-0	0.10-0.35	2.0-20.0	0.35-0.45	i i	20-70
I	6-10	75-100	1	0-10	1.40-1.70	6.0-20.0	0.04-0.09	0.0-2.9	0.5-1.0
I	10-12	75-100	1	0-10	1.40-1.70	6.0-20.0	0.04-0.09	0.0-2.9	1.0-4.0
I	12-24	90-100	1	0-10	1.40-1.70	6.0-20.0	0.04-0.09	0.0-2.9	1.0-2.0
I	24-42	75-100	1	0-10	1.40-1.70	6.0-20.0	0.04-0.09	0.0-2.9	1.0-2.0
!	42-60	94	1	0-10	1.40-1.70	6.0-20.0	0.04-0.06	0.0-2.9	0.0-0.5
1383960: I	<u> </u> 	 		l I		I I		; ;	
Flink	0-2	i 0-0 i	0-0	I 0-0 I	0.15-0.30	6.0-20.0 I	0.55-0.65	i i	65-85
i	2-3	i 0-0 i	0-0	I 0-0 I	0.15-0.30	6.0-20.0 I	0.55-0.65	i i	65-85
i	3-6	I 96 I	2	1-5	1.35-1.60	6.0-20.0 I	0.06-0.09	1 0.0-2.9 1	1.0-3.0
i	6-9	80-95	2	1-10	1.35-1.65	2.0-20.0	0.05-0.10	0.0-2.9	1.0-3.0
i	9-26	80-95	2	1-10	1.40-1.70	2.0-20.0	0.05-0.08	0.0-2.9	1.0-3.0
i	26-35	96	2	1-3	1.40-1.70	2.0-20.0	0.05-0.08	0.0-2.9	0.0-0.5
i	35-46	96	2	1-3	1.40-1.70	2.0-20.0	0.05-0.08	0.0-2.9	0.0-0.5
i	46-52	5-15	50-90	10-35	1.40-1.80	0.2-2.0	0.13-0.19	0.0-2.9	0.0-0.5
į	52-80	10-80	15-85	5-35	1.40-1.80	0.2-2.0	0.13-0.19	0.0-2.9	0.0-0.5
   144435		 		 		I I			
Arnheim	0-5	' 30 I	55	12-18	1.15-1.60	0.6-6.0	0.12-0.35	0.0-2.9	3.0-15
	5-10		55		1.50-1.80	•		1 0.0-2.9 1	0.5-2.0
	10-15		5-80		1.50-1.80			1 0.0-2.9 1	0.5-2.0
	15-24	I 0-80 I	5-80		1.50-1.80		0.14-0.22		0.5-2.0
	24-60	1 50-85 1	5-30		1.50-1.80		0.14-0.22		0.0-1.0
	-1 00	50 05	5 55	5 15		0.0 2.0	0.11 0.22	1.0 2.3	3.0 1.0
	•					. '			

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name	l -	I	l I	I - 1	bulk	(Ksat)	water	swell	matter
ĺ	I	I	l I	<b>I</b> 1	density	l I	capacity	potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
			. —	. —		ı <del></del> ı		ı — ı	
1444378:	I	I	l I	I 1		l I		1 1	
Wakefield	0-4	J 70	16	8-18	1.30-1.60	0.6-2.0	0.16-0.18	0.0-2.9	1.0-3.0
	4-7	25-75	15-60	6-16	1.30-1.65	0.6-2.0	0.15-0.21	0.0-2.9	0.0-0.5
	7-18	25-75	15-60	8-18	1.30-1.65	0.6-2.0	0.15-0.21	0.0-2.9	0.0-0.5
	18-24	40-75	15-40	10-20	1.80-2.05	0.0-0.1	0.03-0.05	0.0-2.9	0.0-0.5
	24-36	35-70	10-40	12-28	1.80-2.05	0.0-0.1	0.03-0.05	0.0-2.9	0.0-0.5
	36-49	J 39	37	18-30	1.45-1.70	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	49-64	40-75	15-40	10-20	1.45-1.75	0.6-2.0	0.14-0.19	0.0-2.9	0.0-0.5
1444379:	l	I	l I			l I		1	
Wakefield	0-4	J 70	16	8-18	1.30-1.60	0.6-2.0	0.16-0.18	0.0-2.9	1.0-3.0
	4-7	25-75	15-60	6-16	1.30-1.65	0.6-2.0	0.15-0.21	0.0-2.9	0.0-0.5
	7-18	25-75	15-60	8-18	1.30-1.65	0.6-2.0	0.15-0.21	0.0-2.9	0.0-0.5
	18-24	40-75	15-40	10-20	1.80-2.05	0.0-0.1	0.03-0.05	0.0-2.9	0.0-0.5
	24-36	35-70	10-40	12-28	1.80-2.05	0.0-0.1	0.03-0.05	0.0-2.9	0.0-0.5
	36-49	J 39	37	18-30	1.45-1.70	0.6-2.0	0.14-0.18	0.0-2.9	0.0-0.5
	49-64	40-75	15-40	10-20	1.45-1.75	0.6-2.0	0.14-0.19	0.0-2.9	0.0-0.5
	l	I	l I			l I		1	
1444388:	I	I	I I			l I		1 1	
Allendale	•	79	16		1.25-1.40		0.09-0.12		2.0-4.0
I		70-95	•		1.35-1.45		0.06-0.10		0.5-1.0
I	10-13	•	1		1.35-1.45		0.06-0.10	0.0-2.9	0.0-0.5
I	13-26	•	1		1.35-1.45		0.06-0.10		0.0-0.5
		80-95			1.35-1.45			0.0-2.9	
I	28-34	•	25-45		1.45-1.70		0.08-0.12		0.0-0.5
	34-60	15-25	25-45	40-60	1.45-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
1444400		!	!			! !		! !	
1444402:	I	l 67			1 10 1 60		0 10 0 15		4 0 7 0
Tonkey	0-8	67	20		1.10-1.60		0.13-0.15		4.0-7.0
	8-14		10-40		1.30-1.80		0.10-0.15		0.0-0.5
	14-28   28-60	40-75	10-40		1.30-1.80		0.10-0.15		0.0-0.5
	28-60	10-95	5-75	0-20	1.60-1.80	0.6-2.0	0.05-0.19	0.0-2.9	0.0-0.5
1444410:	! !	1				! ! ! !			
Tula	   0-1	I 0-0		. 0-0	0.15-0.40	6.0-20.0	0.35-0.45	' '	30-80
IuIa	I 1-5	I 64	I 30		1.25-1.60		0.16-0.18		1.0-3.0
	I 5-8	I 64	I 32		1.25-1.60		0.08-0.18		0.5-1.0
	I 8-20	l 65	1 28		1.45-1.60		0.10-0.18		0.5-1.0
	20-28	l 65	1 28		1.50-1.60		0.07-0.18		0.5-1.0
	28-37	I 60-85	1 22		1.80-2.05		0.01-0.04		0.0-0.5
	1 37-62		1 40		1.80-2.05			0.0-2.9	
	62-80	•	20		1.50-1.60			0.0-2.9	0.0-0.5
	, <b></b>	<u>-</u>	. <u>-</u>	, , <u>,                                </u>		, <u></u> ,			
1444414:	I	I		· 		i i		į į	
Lupton	0-65	0-0	0-0	0-0	0.15-0.40	0.2-6.0	0.35-0.45	i i	30-80
= 	I	I	ı	ı		i i		ı i	
Cathro	0-28	0-0	0	I 0−0 i	0.28-0.45	0.2-6.0	0.35-0.45	i i	60-85
į	28-49	15-70	10-55	10-30	1.50-1.70	0.2-2.0	0.11-0.22	0.0-2.9	0.0-0.5
	49-60	15-70	10-55	10-30	1.50-1.70	0.2-2.0	0.11-0.22	0.0-2.9	0.0-0.5
	I	I				l I		1 1	

Table 15.-Physical Soil Properties-Continued

					<u>-</u>				
Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name		1 1		l I	bulk	(Ksat)	water	swell	matter
		<u>                                     </u>		<u> </u>	density	<u> </u>		potential	
I	In	Pct	Pct	Pct	g/cc	<u>In/hr</u>	<u>In/in</u>	Pct	Pct_
I		1 1		l I		I I		I I	
1444414:				l I		I I		I I	
Tawas	0-31	1 0-0 1	0-0		0.15-0.40	0.2-6.0	0.35-0.45		30-80
	31-60	75-100	2-20	0-10	1.55-1.80	6.0-20.0	0.02-0.10	0.0-2.9	0.0-0.5
111110		!!				!!!		!!	
1444425:	0 0				0 15 0 40		0 25 0 45	!!!	CF 0F
Lerch	0-3 3-7	0-0     10	0-0		0.15-0.40		0.35-0.45		65-85
!	3-7 7-12		0-35		1.25-1.35		0.11-0.13	9.0-12.0    9.0-12.0	1.0-3.0
!	12-29		0-60		1.25-1.50				0.0-1.0
	29-56	0-35     0-35	0-60 0-60		1.25-1.50 1.25-1.50	0.0-0.1     0.0-0.1		9.0-12.0    9.0-12.0	0.0-0.5 0.0-0.5
	56-80		5-80		1.45-1.65			9.0-12.0    0.0-2.9	0.0-0.5
· ·	30 00	1 0 00 1	5 00	1 3 231	1.45 1.05	0.0 <u>2</u> 0.0	0.00 0.22	1 0.0 2.9 1	0.0 0.5
Herbster	0-5	' 27 I	54		1.35-1.55	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	0.17-0.22	I 0.0-2.9 I	1.0-3.0
	5-10		30-70		1.45-1.60		0.12-0.20		0.5-1.0
i	10-13	. 5-40 i	30-70		1.45-1.60		0.09-0.20		0.5-1.0
i	13-28	23	29		1.45-1.60		0.09-0.13		0.5-1.0
i	28-33	I 5-35 I	20-65		1.40-1.65			6.0-8.9	0.0-0.5
i	33-55	5-35	20-65	35-60 i	1.40-1.65	0.0-0.1	0.09-0.13	6.0-8.9	0.0-0.5
i	55-80	20-80	10-65	5-20	1.45-1.70	0.6-2.0	0.10-0.16	0.0-2.9	0.0-0.5
I		1 1		l I		I I		I I	
1444426:		1 1		l I		l I		1	
Portwing	0-4	27	54	10-27	1.35-1.55	0.6-2.0	0.17-0.22	0.0-2.9	1.0-3.0
I	4-9	15-40			1.45-1.60		0.12-0.20		0.5-1.0
I	9-32		20-60		1.40-1.55			6.0-8.9	0.0-1.0
I	32-51		20-60		1.40-1.55	0.1-0.2		6.0-8.9	0.0-1.0
!	51-80	15-90	10-85	5-15	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
Homboton I	0-5	27	E 4	10 27	1 25 1 55	I 0620 I	0.17-0.22	1 0 0 2 0 1	1 0 2 0
Herbster	5-10	27     16	54 30-70		1.35-1.55		0.17-0.22		1.0-3.0
	10-13	16     5-40	30-70		1.45-1.60 1.45-1.60		0.12-0.20		0.5-1.0 0.5-1.0
	13-28	1 23 I	29		1.45-1.60		0.09-0.20		0.5-1.0
· ·	28-33		20-65		1.40-1.65		0.09-0.13		0.0-0.5
i	33-55	1 18 1	20-65		1.40-1.65			6.0-8.9	0.0-0.5
i	55-80	 I 20-80 I	10-65		1.45-1.70		0.10-0.16		0.0-0.5
i		i i		i i		i i		i i	
1444427:		i i		i i		i i		i i	
Cornucopia	0-3	27	54	10-27	1.35-1.55	0.6-2.0	0.17-0.22	0.0-2.9	1.0-3.0
I	3-10	10-70	15-65	15-45	1.45-1.60	0.2-2.0	0.12-0.20	0.0-2.9	0.5-1.0
I	10-32	10-40	20-50	40-60	1.40-1.55	0.1-0.2	0.08-0.14	6.0-8.9	0.0-1.0
I	32-45	10-40	20-50	40-60	1.40-1.55	0.1-0.2	0.08-0.14	6.0-8.9	0.0-1.0
I	45-50	15-90	10-85	5-20	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
I	50-72	15-90	10-85	5-15	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
1444428:									
Cornucopia		27	54		1.35-1.55		0.17-0.22		1.0-3.0
I		10-70	15-65		1.45-1.60			0.0-2.9	0.5-1.0
!	10-32		20-50		1.40-1.55			6.0-8.9	0.0-1.0
!	32-45				1.40-1.55			6.0-8.9	0.0-1.0
			10-85		1.45-1.70			0.0-2.9	0.0-0.5
	30-72	15-90	10-85	1 2-T2	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
				ı		ı I		1 1	

Table 15.-Physical Soil Properties-Continued

Man unit combal	l Don+h	l Cand !	Silt	Cla '	Moist	l Dormochilit	Available	Christ-	Omacaia
Map unit symbol and soil name	Depth	Sand	SILC	Clay	Moist bulk	Permeability    (Ksat)	Avallable water	Shrink-     swell	Organic matter
and soll name	] ]				density	(KSat)   		swell    potential	macter
	l In	l Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
	<u> </u>	! <del>===</del> !	<u> </u>	1	9/66	! <del>***/***</del>	<del>111/111</del>	! <del></del> !	
1444431:		: :				 		: :	
Croswell	0-1	ı 92 I	6	0-101	1.35-1.65	ı 6.0-20.0 I	0 07-0 09	0.0-2.9	1.0-3.0
CIOSWEII	1-7	75-100			1.30-1.70			0.0-2.9	0.5-2.0
	7-16				1.55-1.70			0.0-2.9	0.6-1.0
	16-39	. 75-100			1.55-1.70	6.0-20.0		0.0-2.9	0.0-0.5
	39-60		2		1.60-1.70			1 0.0-2.9 1	0.0-0.5
i		i i	i	i		i i		i i	
1444432:	l	I I		<b> </b>		l I		1 1	
Gogebic	0-1	I 0-0 I		0-0	0.15-0.30	6.0-20.0	0.45-0.55		60-85
ĺ	1-5	55-80	5-35	5-15	1.30-1.60	0.6-2.0	0.16-0.18	0.0-2.9	1.0-3.0
	5-7	55-80	5-35	5-15	1.50-1.60	0.6-2.0	0.08-0.18	0.0-2.9	0.0-0.5
	7-17	55-80	5-35	5-15	1.50-1.60	0.6-2.0	0.09-0.17	0.0-2.9	0.0-0.5
	17-26		5-35		1.50-1.65			0.0-2.9	0.0-0.5
1	26-36		10-35		1.80-2.05			0.0-2.9	0.0-0.5
· · · · · · · · · · · · · · · · · · ·		55-80			1.80-2.05			0.0-2.9	0.0-0.5
		55-80			1.45-1.60			0.0-2.9	0.0-0.5
	71-80	55-80	10-35	5-15	1.50-1.60	0.6-20.0	0.01-0.04	0.0-2.9	0.0-0.5
1 4 4 4 4 0 5		!!!						!!	
1444435:					1 05 1 40		0 10 0 10		1 0 4 0
Iosco	0-7	81	9		1.25-1.40			0.0-2.9	1.0-4.0
	7-9   9-11	80-95     80-95	9   9		1.35-1.60			0.0-2.9     0.0-2.9	0.0-1.0 0.0-1.0
	9-11   11-28		2		1.35-1.60 1.35-1.60			0.0-2.9	0.0-1.0
	28-34		2		1.35-1.60			1 0.0-2.9	0.0-1.0
	34-40		25-60		1.50-1.70			0.0-2.9     3.0-5.9	0.0-1.0
	40-60		25-60		1.50-1.70	0.2 0.6     0.2-0.6		3.0 5.9     3.0-5.9	0.0-0.5
	1 40 00	1 10 00 1	25 00	1 10 331	1.30 1.70	0.2 0.0   	0.17 0.20	1 3.0 3.3 1	0.0 0.5
1444457:	! 	i i		i		' ' ' '		i i	
Redrim	0-1	i 0-0 i	0-0	0-0 i	0.15-0.30	6.0-20.0	0.55-0.65	i i	65-85
	1-3	I 0-0 I	0-0		0.15-0.30		0.55-0.65		65-85
	3-11	97	2	1-2	1.35-1.60	20.0-20.0	0.03-0.08	0.0-2.9	0.5-2.0
İ	11-18	75-95	0-20	2-5	1.50-1.70	20.0-20.0	0.02-0.10	0.0-2.9	0.0-0.5
ĺ	18-80			I		0.2-2.0			0.0-0.0
I		I I		l I		1		1 1	
1444459:		l I		<b> </b>				1 1	
Zeba	0-2	78	12		1.30-1.70			0.0-2.9	2.0-4.0
I	2-5	69	24		1.40-1.80			0.0-2.9	0.0-0.5
I	5-13		29		1.40-1.80			0.0-2.9	0.0-0.5
	13-21		21		1.40-1.80			0.0-2.9	0.0-0.5
	21-33	68	24		1.40-1.80			0.0-2.9	0.0-0.5
	33-80					0.2-2.0	0.09-0.13		0.0-0.5
1444460:	] 	ı İ		<b> </b>				!!!	
1444460: Abbaye	   0-2	I 0-0 I			0.15-0.30	   5.9-19.8	0.55-0.65		65-85
ADDAYe	0-2   2-4	0-0     82	5		1.30-1.65			   0.0-2.9	1.0-3.0
	2-4   4-13		10		1.30-1.65			0.0-2.9     0.0-2.9	0.5-1.0
	13-25	1 62 1 1 67 1	23		1.35-1.65			0.0-2.9     0.0-2.9	0.5-1.0
	25-32	67     55-85	20		1.35-1.65		0.11-0.15		0.0-0.5
	32-80	55-65		 		0.6-2.0     0.2-2.0		0.0-2.9   	0.0-0.0
	3= 33			' '				į į	2.0 0.0
				•					

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name					bulk	(Ksat)	water	swell	matter
	<u> </u>	<u>                                     </u>		<u> </u>	density	<u> </u>	capacity	potential	
	I In	Pct	Pct	Pct	g/cc	I In/hr I	In/in	Pct	Pct
L444460:	l I	 		 		! !			
Lapoin	   0-1	I 0-0 I		ı 0-0 I	0.15-0.30	' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	0.55-0.65	·	65-85
1dp0111	1-4	1 44 1	40		1.35-1.55			1 0.0-2.9 1	2.0-8.0
	1 4-7	30-80	5-50		1.40-1.65		0.12-0.19		1.0-3.0
	, - ,   7-19	1 5-45 1	20-60		1.35-1.60			1 6.0-8.9 1	0.0-0.5
	19-34	5-40	20-60		1.35-1.50			1 6.0-8.9 1	0.0-0.5
	34-39	i 67 i	23		1.40-1.70			1 0.0-2.9 1	0.0-0.5
	39-80			·		0.2-2.0	0.00-0.00	i i	0.0-0.0
	İ	i i		i i		i i		i i	
1444461:	l	1 1				I I		1 1	
Abbaye	0-2	0-0			0.15-0.30		0.55-0.65		65-85
	2-4	82	5		1.30-1.65		0.09-0.12		1.0-3.0
	4-13		10		1.30-1.65			0.0-2.9	0.5-1.0
	13-25	67	23		1.35-1.65			0.0-2.9	0.5-1.0
	25-32	55-85	20		1.35-1.70	0.6-2.0	0.08-0.14		0.0-0.5
	32-80					0.2-2.0			0.0-0.0
Zeba	I I 0-2	ı 78 I	12	ı ı I 5-15 I	1.30-1.70	I 0.6-2.0 I	0.13-0.15	1 0.0-2.9	2.0-4.0
	2-5	I 69 I	24		1.40-1.80			1 0.0-2.9 1	0.0-0.5
	5-13	i 65 i	29		1.40-1.80			1 0.0-2.9 1	0.0-0.5
	13-21	55-85	21		1.40-1.80			1 0.0-2.9 1	0.0-0.5
	21-33	i 68 i	24		1.40-1.80			1 0.0-2.9 1	0.0-0.5
	33-80	i i		i i		0.2-2.0	0.09-0.13		0.0-0.5
1 4 4 4 4 7 7	l	!!!		! !		!!!		!!!	
1444477: Cublake	I I 0-3	I 1 I 95 I	1	l	1.35-1.60		0 05-0 09	1 0.0-2.9	0.5-2.0
Cubiake	I 3-4	95     80-95	1		1.35-1.65			1 0.0-2.9	0.0-1.0
	3-4   4-23		2		1.40-1.70			1 0.0-2.9	1.0-3.0
	4-23	80-95     80-95	2		1.45-1.70			1 0.0-2.9	0.0-0.5
	32-40	1 96 I	2		1.45-1.70			1 0.0-2.9 1	0.0-0.5
	1 40-48	90-100			1.45-1.70			1 0.0-2.9	0.0-0.5
	1 48-60	1 20-70 I	5-70		1.40-1.80			1 0.0-2.9	0.0-0.5
		i i		 I i		i i		i	
Croswell	0-1	75-100			1.35-1.65			0.0-2.9	1.0-3.0
	1-7	75-100			1.30-1.50			0.0-2.9	0.5-2.0
	7-16				1.40-1.60			0.0-2.9	0.6-1.0
	16-39	75-100	0-20		1.40-1.60			0.0-2.9	0.0-0.5
	39-60	96	2	0-5	1.50-1.65	6.0-20.0	0.05-0.07	0.0-2.9	0.0-0.5
Ashwabay	I I 0-4	ı ı I 85 I	9	ı 1   2-10	1.35-1.65	I 6.0-20.0 I	0.09-0.12	1 0.0-2.9	2.0-4.0
<u>-</u>	•	80-100			1.35-1.65			1 0.0-2.9 1	0.5-1.0
	5-12				1.45-1.70			1 0.0-2.9 1	0.5-1.0
	12-32	80-100	2		1.45-1.70			1 0.0-2.9 1	0.5-1.0
	32-45	97	2		1.55-1.70			1 0.0-2.9 1	0.5-1.0
	45-62		25-60		1.45-1.55			1 6.0-8.9 1	0.0-0.5
	62-80		5-85		1.45-1.55			1 6.0-8.9 1	0.0-0.5
	<del></del>								

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name	<b>_</b>	i .		, <u>-</u> , ,	bulk	(Ksat)	water	swell	matter
		i i		i i	density	, (=====, , , 		potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
	_	i — i		i — i	<del></del>	i ——		i —	
1444478:		i i		i i		i i		i i	
Cublake	0-3	95	1	0-8	1.35-1.60	2.0-20.0	0.05-0.09	0.0-2.9	0.5-2.0
	3-4	80-95	1	0-10	1.35-1.65	2.0-20.0	0.05-0.12	0.0-2.9	0.0-1.0
	4-23	80-95	2	1-10	1.40-1.70	2.0-20.0	0.05-0.08	0.0-2.9	1.0-3.0
	23-32	80-95	2	1-10	1.45-1.70	2.0-20.0	0.04-0.11	0.0-2.9	0.0-0.5
	32-40	96	2	0-5	1.45-1.70	2.0-20.0	0.04-0.11	0.0-2.9	0.0-0.5
	40-48	90-100	0-10	0-5	1.45-1.70	2.0-20.0	0.04-0.11	0.0-2.9	0.0-0.5
	48-60	20-70	5-80	10-20	1.40-1.80	0.2-2.0	0.12-0.18	0.0-2.9	0.0-0.5
Croswell	0-1	   75-100	6	0-10	1.35-1.65	   6.0-20.0	0.06-0.11	0.0-2.9	1.0-3.0
	1-7	75-100	0-20	0-10	1.30-1.50	6.0-20.0	0.06-0.11	0.0-2.9	0.5-2.0
	7-16	75-100	0-20	0-10	1.40-1.60	6.0-20.0	0.06-0.11	0.0-2.9	0.6-1.0
	16-39	75-100	0-20	0-10	1.40-1.60	6.0-20.0	0.05-0.10	0.0-2.9	0.0-0.5
	39-60	96	2	0-5	1.50-1.65	6.0-20.0	0.05-0.07	0.0-2.9	0.0-0.5
Ashwabay	0-4	   85	9	2-10	1.35-1.65	   6.0-20.0	0.09-0.12	0.0-2.9	2.0-4.0
	4-5	80-100	2	1-4	1.35-1.65	6.0-20.0	0.09-0.12	0.0-2.9	0.5-1.0
	5-12	80-100	2	1-4	1.45-1.70	6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
	12-32	80-100	2	1-4	1.45-1.70	6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
	32-45	97	2	1-2	1.55-1.70	6.0-20.0	0.04-0.08	0.0-2.9	0.5-1.0
	45-62		25-60		1.45-1.55	0.1-0.2		6.0-8.9	
	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
1444479:	! 	' 		' '				<u> </u>	
Morganlake	0-4	82	9	2-15	1.35-1.65		0.10-0.12	0.0-2.9	0.5-3.0
	4-8	75-95	5-20		1.35-1.60		0.09-0.14	0.0-2.9	1.0-3.0
	8-26	75-95	5-20	1-11	1.40-1.65	2.0-20.0	0.06-0.12	0.0-2.9	0.0-1.0
	26-31	75-95	5-20	1-7	1.40-1.65	2.0-20.0	0.06-0.12	0.0-2.9	0.0-1.0
	0= -0	10-70	20-65		1.45-1.65			3.0-5.9	
	40-60	10-70	20-65	15-35	1.45-1.65	0.2-0.6	0.13-0.20	3.0-5.9	0.0-0.5
1444480:		l				l		1	
Morganlake	0-4	82	9		1.35-1.65			0.0-2.9	
	4-8	75-95	5-20		1.35-1.60			0.0-2.9	
	8-26	75-95	5-20		1.40-1.65			0.0-2.9	
	26-31	75-95	5-20		1.40-1.65		0.06-0.12		0.0-1.0
	31-40	10-70	20-65		1.45-1.65			3.0-5.9	
	40-60 	10-70   	20-65 	15-35  	1.45-1.65	0.2-0.6   	0.13-0.20	3.0-5.9   	0.0-0.5 
1444481:				i i		i i		į i	
Kellogg	0-2	0-0			0.15-0.30		0.55-0.65		65-85
	2-6	94	1		1.35-1.60		0.06-0.10		0.6-1.0
	6-26	80-95	2		1.35-1.60		0.06-0.10		0.6-1.0
	26-29	5-35	20-60		1.50-1.70			6.0-8.9	
	29-40	5-35	20-60		1.50-1.70		0.09-0.17		0.0-0.5
	40-80	5-35	20-60	30-60  	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
	l	I .		ı 1				1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	-
and soil name	l	1 1		l I	bulk	(Ksat)	water	swell	matter
	<u> </u>	<u>                                     </u>	<u> </u>	l <b>!</b>	density	<u> </u>	<del></del>	potential	
I	In	Pct	Pct	Pct	g/cc	<u>In/hr</u>	<u>In/in</u>	Pct	Pct
1	l	1 1		l I		l I		I I	
1444481:									
Allendale		79	16		1.25-1.40		0.09-0.12		2.0-4.0
	3-10	70-95	2		1.35-1.45	6.0-20.0	0.06-0.10		0.5-1.0
	10-13		1 1		1.35-1.45			0.0-2.9	
		80-95	1 1		1.35-1.45		0.06-0.10		
	26-28		1 1		1.35-1.45			0.0-2.9	
			25-45		1.45-1.70			6.0-8.9	
	34-60	15-25	25-45	40-60	1.45-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
Ashwabay	I 0-4	ı 85 I	9		1.35-1.65		0 09-0 12	0.0-2.9	2.0-4.0
nsiiwabay	1 4-5	80-100			1.35-1.65		0.09-0.12		0.5-1.0
	5-12				1.45-1.70			0.0-2.9	
	12-32	80-100			1.45-1.70			0.0-2.9	
i	32-45		2		1.55-1.70		0.04-0.08		
i	45-62				1.45-1.55			6.0-8.9	
	62-80	10-90	5-85		1.45-1.55		0.08-0.12		0.0-0.5
	, <u></u>	, <u>-</u> , ,,		, <u> </u>		,	***************************************		0.0 0.0
1444482:	İ	i i		i i		i i		i i	
Kellogg	0-2	I 0-0 I		0-0	0.15-0.30	6.0-20.0	0.55-0.65		65-85
ĺ	2-6	94	1 1	2-8	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.6-1.0
ĺ	6-26	80-95	2	2-12	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.6-1.0
ĺ	26-29	5-35	20-60	30-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
1	29-40	5-35	20-60	35-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
	40-80	5-35	20-60	30-60	1.50-1.70	0.0-0.2	0.09-0.17	6.0-8.9	0.0-0.5
	l			l		l		1	
Allendale	0-3	79	16		1.25-1.40			0.0-2.9	
	3-10		2		1.35-1.45			0.0-2.9	
		80-95	1		1.35-1.45		0.06-0.10		0.0-0.5
		80-95			1.35-1.45			0.0-2.9	
	26-28		1 1		1.35-1.45		0.06-0.10		
	28-34		25-45		1.45-1.70			6.0-8.9	0.0-0.5
	34-60	15-25	25-45	40-60	1.45-1.70	0.0-0.1	0.08-0.12	6.0-8.9	0.0-0.5
Ashwabay	I I 0-4	ı 85 i	9	I 2-10I	1.35-1.65		0 00-0 12		2.0-4.0
Asiiwabay		80-100			1.35-1.65		0.09-0.12		0.5-1.0
		80-100			1.45-1.70			0.0-2.9	
	12-32				1.45-1.70			0.0-2.9	
	32-45		2		1.55-1.70			0.0-2.9	
i	45-62		25-60		1.45-1.55	0.1-0.2		6.0-8.9	
	62-80	10-90	5-85		1.45-1.55	0.1-0.2	0.08-0.12		0.0-0.5
i		 I i		. – i i		i i		i i	
1444486:	l	ıi	ı i	ı i		ı i		ı i	
Sedgwick	0-5	67	20	8-18	1.35-1.65	0.6-2.0	0.10-0.15	0.0-2.9	2.0-4.0
I	5-8	82	9	3-15	1.45-1.70	0.6-2.0	0.08-0.17	0.0-2.9	0.5-1.0
	8-16	67	20	8-18	1.40-1.70	0.6-2.0	0.10-0.17	0.0-2.9	1.0-2.0
	16-19	5-60	20-65	18-70	1.40-1.70	0.0-2.0	0.07-0.16	6.0-8.9	0.0-0.5
1	19-53	5-40	25-65	30-70	1.45-1.70	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
	53-80	5-40	25-65	30-70	1.50-1.80	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
	l	1 1		l 1		1 1		1 1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name		l 1		l I	bulk	(Ksat)	water	swell	matter
	<u> </u>	<u> </u>	l	<u> </u>	density	<u> </u>	capacity	potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
				ı — ı		I I		1	
1444486:	l	l 1	l	l I		1		1 1	
Munuscong	0-8	68	22	5-15	1.30-1.65		0.13-0.15	0.0-2.9	2.0-3.0
	8-30		20		1.30-1.70			0.0-2.9	0.0-0.5
	30-60	1	20-70	35-80	1.35-1.70	0.1-0.2	0.08-0.18	6.0-8.9	0.0-0.5
1444487:	l		1					!!!	
Superior	I I 0-3	ı 68 i	l l 21		1.35-1.65	ı	0 12-0 10	1 0.0-2.9 1	1.0-3.0
superior	1 3-6	I 68 I	21		1.35-1.65			1 0.0-2.9	0.5-1.0
	3-6   6-14		23					1 0.0-2.9 1	0.5-1.0
	6-14   14-19		23   28		1.55-1.65				
			-		1.60-1.70			6.0-8.9	0.0-0.5
	19-26		28		1.60-1.70			6.0-8.9	0.0-0.5
	26-60	17	28	40-70	1.60-1.70	0.0-0.1	0.07-0.13	6.0-8.9	0.0-0.5
Sedgwick	l 0-5	I 82 I	9	3-15	1.35-1.65		0.10-0.15	1 0.0-2.9 1	2.0-4.0
	5-8	I 82 I	9	I 3-15 I	1.45-1.70	0.6-2.0	0.08-0.17	1 0.0-2.9 1	0.5-1.0
	8-16		20		1.40-1.70			1 0.0-2.9 1	1.0-2.0
	16-19		20-65		1.40-1.70			1 6.0-8.9 1	0.0-0.5
	19-53	5-40	25-65		1.45-1.70			1 6.0-8.9 1	0.0-0.5
	53-80	5-40	25-65		1.50-1.80			1 6.0-8.9 1	0.0-0.5
		, <u> </u>	_0 00	, 30 .0, I I		,	0.0. 0.20	1	0.0 0.0
1444488:		i i		i i		i i		i i	
Superior	0-3	68	21	7-15	1.35-1.65	0.6-2.0	0.12-0.18	0.0-2.9	1.0-3.0
_	3-6	68	23	5-13	1.35-1.65	0.6-2.0	0.12-0.18	1 0.0-2.9 1	0.5-1.0
	6-14	66	23	7-15	1.55-1.65	0.6-2.0	0.11-0.19	1 0.0-2.9 1	0.5-1.0
	14-19	I 22 İ	28		1.60-1.70		0.08-0.13	1 6.0-8.9 1	0.0-0.5
	19-26	I 12 I	28	I 45-751	1.60-1.70	0.0-0.1 I	0.08-0.13	1 6.0-8.9 1	0.0-0.5
	26-60		28		1.60-1.70			6.0-8.9	0.0-0.5
		İ		İ		İ		i i	
Sedgwick	0-5	82	9	3-15	1.35-1.65	0.6-2.0	0.10-0.15	0.0-2.9	2.0-4.0
	5-8	82	9	3-15	1.45-1.70	0.6-2.0	0.08-0.17	0.0-2.9	0.5-1.0
	8-16	67	20	8-18	1.40-1.70	0.6-2.0	0.10-0.17	0.0-2.9	1.0-2.0
	16-19	5-60	20-65	18-70	1.40-1.70	0.0-2.0	0.07-0.16	6.0-8.9	0.0-0.5
	19-53	5-40	25-65	30-70	1.45-1.70	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
	53-80	5-40	25-65	30-70	1.50-1.80	0.0-0.2	0.07-0.16	6.0-8.9	0.0-0.5
1444400						!!!		!!!	
1444489:		l 0-0 l	l I 0		0 15 0 20		0 55 0 65	!!!	6E 0E
Sultz	0-2		,		0.15-0.30		0.55-0.65		65-85
	2-6	80-100			1.40-1.65			0.0-2.9	0.5-1.0
	6-18				1.45-1.70			0.0-2.9	1.0-2.0
	18-25		2		1.45-1.70			0.0-2.9	0.0-0.5
	25-43		2		1.50-1.70			0.0-2.9	0.0-0.5
	43-60	50-90	5-50	2-20	1.45-1.70	0.6-2.0	0.10-0.15	0.0-2.9	0.0-0.5
				ı 1		ı I		1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available	Shrink-	Organic
and soil name		i .		, <u>-</u> , ,	bulk	(Ksat)	water	swell	matter
i		į		i i	density	i i	capacity	potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
ĺ	_			ı — ı		ı — ı			
1444489:	l	l I		l I		I I		1	
Ashwabay	0-4	85	9		1.35-1.65		0.09-0.12	0.0-2.9	2.0-4.0
I		80-100			1.35-1.65		0.09-0.12		0.5-1.0
I		80-100			1.45-1.70		0.05-0.11		0.5-1.0
I	12-32	80-100			1.45-1.70		0.05-0.11		0.5-1.0
	32-45	•	2		1.55-1.70			0.0-2.9	0.5-1.0
	45-62	10-40	25-60		1.45-1.55	0.1-0.2		6.0-8.9	0.0-0.5
	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
Rubicon	I I 0-1	I 96	2		1.25-1.45		0 05-0 09	1 0.0-2.9	0.5-2.0
Rubicon	1 1-6	96	2		1.30-1.60			1 0.0-2.9	0.0-0.5
	6-18	•	1		1.30-1.60			0.0-2.9	0.6-1.0
	18-36		1		1.30-1.60		0.04-0.08		0.6-1.0
i	36-60		2		1.40-1.65		0.04-0.06		0.0-0.5
İ	I	i i		i i		i i		i i	
1444492:	l	I		l I		I I		1 1	
Manistee	0-3	91	2	3-12	1.35-1.60	6.0-20.0	0.10-0.12	0.0-2.9	2.0-4.0
	3-11	80-95	2	2-12	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	1.0-2.0
1	11-28	80-95	2	2-12	1.35-1.60	6.0-20.0	0.06-0.10	0.0-2.9	0.3-0.8
I	28-30	80-95	2		1.35-1.60			0.0-2.9	0.3-0.8
I	30-38	10-40	25-50		1.50-1.70		0.08-0.12		0.0-0.5
	38-60	10-40	25-50	35-60	1.60-1.75	0.1-0.2	0.08-0.16	6.0-8.9	0.0-0.5
Vallage	I I 0-2	I I 0-0 I			0.15-0.30		0.55-0.65		60-85
Kellogg	0-2   2-6	0-0   94	1		1.35-1.60		0.06-0.10		0.6-1.0
	2 0   6-26	93 <u>-</u>   80-95	2		1.35-1.60		0.06-0.10		0.6-1.0
		1 10-80	5-60		1.35-1.65		0.00-0.15		0.0-0.5
	29-40		20-60		1.50-1.70		0.09-0.17		0.0-0.5
	1 40-80	5-35	20-60		1.50-1.70	1 0.0-0.2 1	0.09-0.17		0.0-0.5
				,, 		i i		i i	
Ashwabay	0-4	85	9	2-10	1.35-1.65	6.0-20.0	0.09-0.12	0.0-2.9	2.0-4.0
	4-5	80-100	2	1-4	1.35-1.65	6.0-20.0	0.09-0.12	0.0-2.9	0.5-1.0
1	5-12	80-100	2	1-4	1.45-1.70	6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
	12-32	80-100		1-4	1.45-1.70	6.0-20.0	0.05-0.11	0.0-2.9	0.5-1.0
1	32-45	•	2	1-2	1.55-1.70	6.0-20.0	0.04-0.08	0.0-2.9	0.5-1.0
I	45-62	•	25-60		1.45-1.55	0.1-0.2		6.0-8.9	0.0-0.5
	62-80	10-90	5-85	2-60	1.45-1.55	0.1-0.2	0.08-0.12	6.0-8.9	0.0-0.5
1444506.	l					! !		! !	
1444506:   Keweenaw	I I 0-2	I   75-95 ∣	12	ı 1 ı 2_1∩ı	1.35-1.60		0.10-0.12	1 0 0-2 9 1	1.0-2.0
Treweellaw		75-95	12		1.45-1.80		0.10-0.12		0.5-1.0
	2-4   4-16	55-95	12		1.55-1.80		0.09-0.14		0.0-0.5
	•	75-95			1.55-1.80			0.0-2.9	0.0-0.5
		75-95	9		1.55-1.80			1 0.0-2.9	0.0-0.5
		75-95	2		1.55-1.80			0.0-2.9	0.0-0.5
i	43-75		4		1.55-1.80		0.08-0.13		0.0-0.5
İ	75-80	75-95	9		1.50-1.70		0.05-0.10	0.0-2.9	0.0-0.5
i	I	ı	ı İ	ı		i i		ı i	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Class I	Moist	Permeability	Available	Shrink-	Opposio
and soil name	l pebru	, sand	l SIIC	Clay	bulk	rermeability    (Ksat)	water	smrink-	Organic matter
and soll name	! !	!			density	(ASAL)		swell    potential	matter
	l In	l Pct	l Pct	l Det l	<del></del>	In/hr	In/in	Pct	Det.
	! <u></u>	PCT	PCT	Pct	g/cc	! <u>In/nr</u> !	<u> </u>	! PCT !	Pct
1444506	!	!		!		!		!!!	
1444506:	1	I			1 25 1 70		0.07.0.00	1 1	0 5 0 0
Rubicon	•	90-98	2		1.35-1.70		0.07-0.09		0.5-2.0
	1-6	90-98	2		1.35-1.70			0.0-2.9	
	6-18		2		1.60-1.70			0.0-2.9	
	18-36	•	2		1.60-1.70			0.0-2.9	
	36-60	90-98	2	0-5   	1.60-1.80	6.0-20.0	0.02-0.07	0.0-2.9	0.0-0.5
1444507:	!	!		!!!		!		!!!	
	I I 0-2	ı I 75-95	l 12	l 101	1.35-1.60		0.10-0.12	1 0 0 0 0 1	1.0-2.0
Keweenaw	•	75-95   55-95	•					1 0.0-2.9	
	2-4	•	•		1.45-1.80				
	4-16   16-20	•	l 12   I 9		1.55-1.80			0.0-2.9     0.0-2.9	
		•			1.55-1.80				
	•	75-95			1.55-1.80			0.0-2.9	
	•	75-95	2		1.55-1.80			0.0-2.9	
	•	55-85	•		1.55-1.80			0.0-2.9	
	/5-8U	75-95	9	2-10	1.50-1.70	2.0-6.0	0.05-0.10	0.0-2.9	0.0-0.5
Rubicon	I I 0-1	ı I 90-98	l 2		1.35-1.70	I 6.0-20.0	0 07 0 00	1 0.0-2.9	0.5-2.0
Rubicon	•	90-98   90-98	2		1.35-1.70			1 0.0-2.9	
	1-6   6-18	•	l 2						
	6-18   18-36		l 2		1.60-1.70 1.60-1.70			0.0-2.9	
	18-36   36-60	•	<u>2</u>     2	ı 0-5 i I 0-5 i				0.0-2.9	
	1 36-60	90-98		U-5	1.60-1.80	6.0-20.0	0.02-0.07	0.0-2.9	0.0-0.5
1444585:	!	!				!		! !	
Meehan, beaches-	I 0-4	ı I 96	l 2		1.35-1.65	2.0-6.0	0.10-0.12	1 0 0-2 0 1	0.5-3.0
Meenan, beaches-	0-4   4-29	I 80-95	1 2	1-4     4-9			0.10-0.12		0.0-0.5
	1 29-60		1 2	4-9     1-4		1 6.0-20.0   1 6.0-20.0		1 0.0-2.9 1	0.0-0.5
	1 29-00	1 30	2	1- <del>4</del>	1.00-1.70	1 0.0-20.0	0.02-0.07	1 0.0-2.9	0.0-0.5
1444586:	l I	! !				! !			
Wurtsmith,	! 					' '		; ;	
beaches	   0-1	' 		i	0.15-0.30	   5.9-20.0	0.55-0.65	'	65-85
Deaches	1 1-4	ı I 96	1 2	' '	1.30-1.55		0.06-0.09		0.5-2.0
	4-24	•	•		1.40-1.60			1 0.0-2.9	
	1 24-48	•	1 2		1.50-1.65			1 0.0-2.9	
	1 48-80	•	1 2	l 0-5 I		1 6.0-20.0 I	0.05-0.07		0.0-0.5
	, 10 00 I	1	_	, , , , , , , , , , , , , , , , , , ,	1.50 1.05	1 0.0 20.0	0.00 0.07	1 0.0 2.0 1	0.0 0.5
1444587:	i	i		i		i		i i	
Grayling,	i	i		i i		i		i i	
beaches	I 0-3	I 94	1	. 0-10 i	1.30-1.65	6.0-20.0	0.07-0.09	0 0-2 9	1.0-6.0
Deadlieb	3-15		1		1.30-1.65			1 0.0-2.9 1	
	15-23	•	1		1.30-1.65			1 0.0-2.9 1	
	23-60	•	1		1.45-1.65		0.04-0.06		0.0-0.5
	, 23 00 I	, ) <u>,</u>		, J 101		, 0.0 <u>2</u> 0.0	0.01 0.00	0.0 2.5	0.0 0.5
1529830:	i I	i	i	· '		i		; '	
Meehan, beaches-	I 0-4	, I 96	2	1-4	1.35-1.65	2.0-6.0	0.10-0.12	0.0-2.9	0.5-3.0
,,	4-29		2		1.60-1.70	•		1 0.0-2.9 1	
	29-60	•	2		1.60-1.70			0.0-2.9	
			. = 	 		<u></u> ,			

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay	Moist	Permeability	Available		Organic
and soil name					bulk	(Ksat)	water	swell	matter
		<u> </u>		<u> </u>	density	<u> </u>	capacity	potential	
	In In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
1700372:	l I	 				] 			
Loxley	0-13	I 0-0 I	0	I 0-0 I	0.30-0.40	   6.0-20.0	0.55-0.65	i i	70-90
	13-60	0-0	0		0.10-0.35		0.35-0.45		70-90
								1 1	
Beseman	0-36	0-0	0		0.10-0.25		0.35-0.45		25-75
	36-60 	25-70	20-80	8-25  	1.35-1.60	0.2-0.6	0.09-0.22	0.0-2.9	0.5-1.0
Dawson	0-8	0-0		0-0	0.15-0.30	   6.0-20.0	0.55-0.65	i i	65-85
	8-38	0-0		0-0	0.15-0.40	0.2-6.0	0.35-0.45		65-85
	38-40	31	57	0-15	1.55-1.75	0.6-2.0	0.18-0.20	0.0-2.9	5.0-15
	40-60	94	1	0-10	1.55-1.75	6.0-20.0	0.03-0.07	0.0-2.9	0.0-0.5
1700373:	]	 							
Rifle	0-4	i 0-0 i	0	0-0 i	0.20-0.35	2.0-6.0	0.55-0.65	i i	70-90
	4-60	i 0-0 i	0	0-0			0.45-0.55		70-90
1700374						!!!		!!!	
1700374: Allendale	I I 0-3	I 79 I	16	l 1	1.25-1.40		0 00 0 10	1 0.0-2.9	2.0-4.0
Allendale	0-3   3-10	79     70-95	2		1.35-1.45			1 0.0-2.9	0.5-1.0
	10-13		1		1.35-1.45			1 0.0-2.9	0.0-0.5
		80-95     80-95	1		1.35-1.45			1 0.0-2.9	0.0-0.5
	26-28		1		1.35-1.45			1 0.0-2.9	0.0-0.5
	28-34		25-45		1.45-1.70			1 6.0-8.9	0.0-0.5
		15-25			1.45-1.70			6.0-8.9	0.0-0.5
1 1					0 40 0 05		0 05 0 45	!!!	00 50
Wakeley		0-0			0.10-0.35		0.35-0.45		20-70
	4-23	75-95	5-20		1.40-1.55			0.0-2.9	0.3-0.8
	23-28   28-80	75-95     10-30	5-20 20-60		1.40-1.55 1.50-1.70			0.0-2.9	0.3-0.8
		i i		i i		i i		i	
Kinross	0-6	0-0		0-0	0.10-0.35		0.35-0.45		20-70
	6-10	75-100	1	0-10	1.40-1.70	6.0-20.0	0.04-0.09	0.0-2.9	0.5-1.0
· · · · · · · · · · · · · · · · · · ·		75-100			1.40-1.70			0.0-2.9	1.0-4.0
I	12-24				1.40-1.70		0.04-0.09	0.0-2.9	1.0-2.0
I	24-42				1.40-1.70			0.0-2.9	1.0-2.0
	42-60	94	1	0-10	1.40-1.70	6.0-20.0	0.04-0.06	0.0-2.9	0.0-0.5
1702605:	 	, ! 				' ' 		; ;	
Menominee	0-4	82	9	2-15	1.35-1.65	6.0-20.0	0.10-0.12	0.0-2.9	0.5-3.0
	4-7	80-95	4	2-10	1.45-1.70	6.0-20.0	0.10-0.12	0.0-2.9	0.0-0.5
	7-23	80-95	2	2-12	1.35-1.65	6.0-20.0	0.10-0.12	0.0-2.9	0.3-0.8
	23-39	15-65	25-50	15-40	1.45-1.70	0.2-0.6	0.03-0.17	0.0-2.9	0.0-0.5
	39-59	15-65	25-50	15-40	1.45-1.75	0.2-0.6	0.13-0.18	3.0-5.9	0.0-0.5
	59-80	15-65	25-50	10-30	1.45-1.75	0.2-0.6	0.13-0.18	3.0-5.9	0.0-0.5
	1	1 1		l I		1 1		1 1	

Table 15.-Physical Soil Properties-Continued

Map unit symbol	Depth	Sand	Silt	Clay		Permeability	Available		Organic
and soil name		!!!			bulk	(Ksat)	water	swell	matter
	<u> </u>	<u>                                     </u>		<u> </u>	density	<u> </u>		potential	
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct
	<u> </u>	!!!				! !		!!!	
1702606:					0 45 0 00		0 55 0 65	!!!	65.05
Deerton	0-1	0-0			0.15-0.30		0.55-0.65		65-85
	1-9   9-10	92     84	2   9		1.30-1.60 1.30-1.60		0.06-0.10 0.05-0.10		0.5-2.0 0.1-1.0
	9-10   10-25		2		1.30-1.60	•	0.05-0.10		0.1-1.0
	10-25   25-39	   31		3-12  		1 0.2-20.0 1	0.05-0.10	0.0-2.9	0.1-1.0
	1 39-80			 		0.2-2.0     0.2-2.0		 	0.0-0.0
	39 00 	; ;		: i		0.2 2.0   		: :	0.0 0.0
Brownstone	   0-2	I 0-0 I		' 0-0 I	0.15-0.30	   6.0-20.0	0.55-0.65	i i	65-85
	2-12		2		1.55-1.85		0.04-0.09		0.5-2.0
	12-15	80-100	6	I 2-5 I	1.60-1.90	6.0-20.0	0.03-0.08	1 0.0-2.9 1	2.0-3.0
	15-23		2		1.60-1.90		0.03-0.08		1.0-2.0
	23-33	80-100	6	2-5	1.60-1.90	6.0-20.0 j	0.03-0.06	0.0-2.9	0.0-0.5
	33-80	i i	i			0.2-2.0		i i	0.0-0.0
	l	l I	1			I I		1 1	
1702607:	l	I I	1			I I		1 1	
Deerton	0-1	I 0-0 I			0.15-0.30		0.55-0.65		65-85
	1-9	92	2		1.30-1.60		0.06-0.10		0.5-2.0
	9-10		9		1.30-1.60		0.05-0.10		0.1-1.0
	10-25		2		1.30-1.60		0.05-0.10		0.1-1.0
	25-39					0.2-2.0		! !	0.0-0.5
	39-80					0.2-2.0		! !	0.0-0.0
Brownstone	I I 0-2	I 0-0 I		I 0-0 I	0.15-0.30	ı 6.0-20.0 I	0.55-0.65	' '	65-85
220411000110	2-12		2		1.55-1.85		0.04-0.09		0.5-2.0
	1 12-15		6		1.60-1.90		0.03-0.08		2.0-3.0
	15-23		2		1.60-1.90		0.03-0.08		1.0-2.0
	23-33		6		1.60-1.90		0.03-0.06		0.0-0.5
	33-80			. – . I ––– i		0.2-2.0		i	0.0-0.0
	I	i i	i	i i		i i		i i	
1702608:	l	l I				I I		1 1	
Abbaye	0-2	0-0			0.15-0.30		0.55-0.65		65-85
	2-4	82	9		1.30-1.65		0.09-0.12		1.0-3.0
	4-13		10		1.30-1.65		0.09-0.12		0.5-1.0
	13-25		23		1.35-1.65		0.11-0.15		0.5-1.0
	25-32	55-85	20		1.35-1.70		0.08-0.14		0.0-0.5
	32-80	! !				0.2-2.0		! !	0.0-0.0
1711685:	 					ļ		! !	
1711685: Cublake	I I 0-3	I I I 95 I	1	ı ∩_0 ı	1.35-1.60		0.05-0.09	1 0 0-3 0 1	0.5-2.0
Cubrake		95    80-95	1 1		1.35-1.60		0.05-0.09		0.5-2.0
	3-4   4-23		2		1.40-1.70		0.05-0.12		1.0-3.0
	4-23		2		1.45-1.70		0.04-0.11		0.0-0.5
	23-32   32-40		2		1.45-1.70		0.04-0.11		0.0-0.5
	32-40   40-48		0-10		1.45-1.70		0.04-0.11		0.0-0.5
	40-46   48-60		5-80		1.40-1.80		0.12-0.11		0.0-0.5
	, 10 00	, , , , ,				, 0.2 2.0	J J U	, 0.0 2.0	0.00.0

Table 15.-Physical Soil Properties-Continued

Map unit symbol	ī	Depth	T	Sand	ī	Silt	T	Clay	Moist	ī	Permeability	T	Available   Shrink-   Orga	nic
and soil name	1				1		1	- 1	bulk	ı	(Ksat)	1	water   swell   mat	ter
	1		1		1		1	- 1	density	Ι		1	capacity  potential	
	ī	In	T	Pct	ī	Pct	T	Pct	g/cc	ī	In/hr	ī	In/in   Pct   Pct	
	1		I		ı		Τ			ı		1		•
1711685:	1		1		1		1	- 1		ı		1	1 1	
Keweenaw	-	0-2		75-95	1	12	1	2-10	1.35-1.60	ı	2.0-6.0	1	0.10-0.12   0.0-2.9   1.0-	2.0
	1	2-4		55-95	1	12	1	2-15	1.45-1.80	ı	2.0-6.0	1	0.09-0.14   0.0-2.9   0.5-	1.0
	1	4-16		55-95	1	12	1	2-15	1.55-1.80	ı	2.0-6.0	1	0.08-0.13   0.0-2.9   0.0-	0.5
	1	16-20		75-95	1	9	1	2-10	1.55-1.80	ı	2.0-6.0	1	0.05-0.10   0.0-2.9   0.0-	0.5
	1	20-27		75-95	1	9	1	2-10	1.55-1.80	ı	0.6-6.0	1	0.05-0.10   0.0-2.9   0.0-	0.5
	1	27-43		75-95	1	2	1	2-15	1.55-1.80	ı	0.6-6.0	1	0.05-0.10   0.0-2.9   0.0-	0.5
	1	43-75	1	55-85	1	4	1	5-20	1.55-1.80	ı	0.6-6.0	1	0.08-0.13   0.0-2.9   0.0-	0.5
	1	75-80	1	75-95	1	9	1	2-10	1.50-1.70	ı	2.0-6.0	1	0.05-0.10   0.0-2.9   0.0-	0.5
	1				1		1	- 1		ı		1	1 1	

Table 16.-Erosion Properties

(Entries under "Erosion factors" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer)

<u> </u>	· · · · · · · · · · · · · · · · · · ·	Ero	sion facto	rs	Wind	Wind
Map unit symbol   and soil name	Depth (inches)	   Kw	   Kf	l T	bility	erodi-   bility
		<u> </u> 	<u> </u>	<u> </u>	group	index
433292:	i	İ	i	i i		İ
Lerch          	0-3 3-7 7-12 12-29 29-56 56-80	.28	.02   .20   .28   .28   .28	5   	<b>4</b>	86 
Herbster	0-5 5-10   10-13   13-28   28-33   33-55   55-80	.37 .24 .32 .32	.37   .37   .37   .24   .32   .32   .24	5     5   	5	   56           
433296:		<u> </u> 	i			i I
Cublake          	0-3	.15   .15   .15   .15	.02   .17   .15   .15   .15   .15	5   	1	220   
Croswell	0-1 1-7 7-16 16-39 39-60	.02 .02 .02	.02   .02   .02   .02   .02	5     5   	1	   220       
Ashwabay	0-4 4-5 5-12 12-32 32-45 45-62 62-80	.17   .17   .17   .17   .28	.10   .17   .17   .17   .17   .17   .28   .28	4     1   	1	   220           
433299:			i	I		i I
Cublake	0-3 3-4 4-23 23-32 32-40 40-48 48-60	.15		5     5       	1	220 
Croswell          	0-1 1-7 7-16 16-39 39-60	.02 .02 .02 .02	.02   .02   .02   .02   .02	5     5         	1	   220         

Table 16.—Erosion Properties—Continued

Kellogg			Ero	sion facto	rs	Wind	Wind
433299: Ashwabay		<u>-</u>	l	1	1		
Ashwabay	and soil name	(inches)	Kw	Kf	l T	-	_
Ashwabay	!		<u> </u>	<u> </u>	1	group	index
Ashwabay	433299: I		l I	 	 		 
4-5	•	0-4	.10	.10	4	1	, l 220
5-12   1.17   1.17   1.17   1.220   1.44   1.45-62   1.28   1.28   1.28   1.45   1.4			•	•		, <u>-</u>	
12-32   .17   .1			•	•		<u> </u> 	! !
32-45   .17   .17			•	•		l I	! !
### Ashwabay	-		•	•		]	! !
433300:  Kellogg	I		•	•	!	1	!
433300:  Kellogg	-		•	•		<u> </u>	! !
Rellogg	i	02 00	1 .20	1	i		i I
2-6   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .02   .03	433300:		l .	I		l .	l
Ashwabay	Kellogg		•	•	4	1	220
Allendale	l		•	•	1		I
Allendale	I	6-26		•	1		l
Allendale	I	26-29	.32	.32	1		I
Allendale	1	29-40	.32	.32	1		l
3-10	1	40-80	.32	.32			!
3-10	Allendale	0-3	l 1 10	l 1 10	1 1	2	13/
10-13	Allendale		•	•		. <del>.</del>	1 134
13-26   .02   .02   .02			•	•		l i	!
26-28	I		•	•		1	!
Ashwabay	ļ.		•	•			! :
Ashwabay	!		•	•	!		!
Ashwabay	!		•	•	!		!
4-5		34-60	.28 	.28		Ì	 
5-12	Ashwabay	0-4	.10	.10	4	1	l 220
5-12	- i	4-5	.17	.17	i i	1	İ
12-32	i	5-12	•	•	i i	İ	i
32-45	į		•	•	i i	i	i
45-62   .28   .28	i		•	•			i
A33301:	;		•	•			<u>'</u>
A33301:  Kellogg	i		•	•			i
Kellogg	i		i	i	i i	İ	i
2-6	433301:		!	!			!
6-26	Kellogg		•	•		1	220
26-29   .32   .32	I		•	•	1		l
29-40	I			•	1		l
Allendale	I		•	•	1		l
Allendale	I		•	•			l
3-10	1	40-80	.32	.32			<u> </u>
3-10	Allendale	0-3	ı I .10	1 .10	I I 4	l 2	ı I 134
10-13   .02   .02	1		•	•	i	. <del>-</del> I	. <u></u> -
13-26   .02   .02			•	•	i		i
26-28   .02   .02	1					1 	' 
28-34   .28   .28	1					1 	' 
34-60   .28   .28						! !	! !
Ashwabay							' 
4-5   .17   .17	i		l	I	i i	]	i I
5-12   .17   .17	Ashwabay				4	1	220
12-32   .17   .17	1	4-5	.17	.17	1		l
12-32   .17   .17	1	5-12	.17	.17	1	1	I
32-45   .17   .17           45-62   .28   .28           62-80   .28   .28	1	12-32	.17	.17	1	l	I
45-62   .28   .28           62-80   .28   .28	i				1	Ì	I
62-80   .28   .28	i				1	Ì	I
	i				1	Ì	I
	i				ı İ	l	I

Table 16.—Erosion Properties—Continued

<u></u>		Ero	sion factor	rs	Wind	Wind
Map unit symbol   and soil name	Depth   (inches)   	Kw	   Kf 	   T 	erodi-   bility   group	erodi-   bility   index
			Ī.	<u>!</u>	<u>.</u>	!
433304:   Sedgwick	0-5 I	.28	l l .28	l I 3	l I 3	l I 86
Jeag #10.1	5-8	.24	.24	, J	i I	l GG
i	8-16 i	.28	.28	İ	İ	İ
1	16-19	.43		I	l	I
!	19-53	.28		!	!	!
	53-80	.28	.28 	l I	l I	! !
Munuscong	0-8 i	.28	.28	4	3	86
!	8-30	.24	.24	!	!	!
	30-60	.28	.28	 	] 	 
433305:	i		i	i	i	i
Superior	0-3	.37	.37	3	3	J 86
!	3-6	.28	.28	!	!	!
ļ	6-14   14-19	.28 .28	•			!
	19-26	.28	•	 	! !	! !
i	26-60		.28	i	i	i
	0.5	10	10	1	I	l . oc
Sedgwick	0-5   5-8	.10 .24	.10   .24	3 	] 3	86 
i	8-16 I		•	! 	! 	<u> </u>
i	16-19	.43	•	İ	i	i
i	19-53 I	.28	.28	ĺ	ĺ	Ī
!	53-80	.28	.28	ļ.	!	<u> </u>
433309:	i		 	! 	! 	! 
Superior	0-3 I	.37	.37	] 3	3	86
!	3-6	.28		!	!	!
ļ	6-14   14-19	.28 .28	•			!
	19-26	.28	.28   .28	 	! !	! !
i	26-60	.28	•	i	i	İ
   Sedgwick	0-5 I	.10	   .10	l I 3	l I 3	l I 86
seagwick	5-8 I	.10		3 	] 3 	l 00
i	8-16		•	i I	i I	i I
i	16-19 i	.43	.43	I	İ	İ
!	19-53	.28		ļ .	!	!
	53-80	.28	.28	 	 	 
433310:	i		i	i	i	i
Sultz	0-2	.02	.02	5	1	220
ļ	2-6	.02 .15				!
<u> </u>	6-18   18-25		.15   .15	 	 	! !
i	25-43		1	! 	i I	i
i	43-60 I		.24	İ	İ	İ
Ashwabay	0-4 I	.10	   .10	   4	   1	l   220
110111111111111111111111111111111111111	4-5			, <u>.</u>	 I	, <u></u> -
i	5-12		1	I	İ	İ
1	12-32	.17	.17	I	I	I
	32-45		.17	1	l	I
	45-62   62-80		.28   .28	 	 	 
i	i		İ	i I	I	İ
Rubicon	0-1   1-6	.02 .10	.02   .15	J 5	1	220
	1-6   6-18			 	! 	! 
i	18-36		1	İ	i	i
i	36-60			İ	I	I
1	I		I	I	I	I

Table 16.—Erosion Properties—Continued

1		Ero	sion facto	rs		Wind	
Map unit symbol	-	!				erodi-	
and soil name	(inches)	Kw	:	T	-	bility	
		<u> </u>	<u> </u>	1	group	index	
433314:		! !	! !	1 1		! !	
Manistee	0-3	.02	.02	1 4	1	,   220	
1		•		i i	_	,v	
i		•	•	i i		i	
i		•		i		i	
;		•	.32	: :		! !	
;		•		' '		! !	
i	30 00	1 .32	1 .32	i		i	
Kellogg	0-2	.02	.02	4	1	220	
1	2-6	.02	.02	1 1		I	
i	6-26	.15		i i		i	
i		•	•	i i		i	
i		•		i i		i	
i		•	•	i i		I	
i	10 00	•	i	i i		i	
Ashwabay	0-4	.10	.10	4	1	220	
1	4-5	.17	.17	1 1		I	
1	5-12	.17	.17	1 1		I	
i	12-32	i .17		i i		i	
i		.17	.17	i i		i	
i		•	28	i i		i	
i		•	.28	i i		i	
i		İ	İ	i i		i İ	
433326:		I	I	1 1		I	
Rubicon		•	•	5	1	220	
1	1-6	.02	.02	1 1		I	
I	6-18	.02	.02	1 1		I	
1	18-36	.02	.02	1 1		I	
I	36-60	.02	.02	1 1		I	
1		I	I	1 1		I	
433379:				! !			
Allendale		•		4	2	134	
I		•	•	1		I	
1		•	•	1 1		I	
I	13-26	.02	.02	1 1		l	
1	26-28	.02	.02	1 1		I	
1	28-34	.28	.28	1 1		I	
1	34-60	.28	.28	1 1		I	
100515		!	!			!	
433515:	0-65	1 00	1 00		0	1	
Lupton	0-65	.02	.02	] 3	8	0	
1		1 1	! !	1 1		! !	
Cathro	0-28	ı   .02	.02	1 2	8	i I 0	
1			.28	!	J	i v	
i	49-60	.28	.28			i	
i	00	<u></u>	<u></u>			i	
Tawas	0-31	.02	.02	2	8	, i 0	
1	31-60		.15	. <u>-</u> !		I	
i		İ	İ	i i		İ	
433572:		I	I	ı i		I	
Portwing	0-4	.43	.43	5	5	J 56	
1	4-9	.37	.37	1 1		I	
İ	9-32	.24	.24	ı		I	
İ	32-51		.24	ı		I	
i	51-80		.24	ı i		I	
İ		I	I	ı i		I	

Table 16.—Erosion Properties—Continued

Ī	ı	Ero	sion factor	rs	Wind	Wind
Map unit symbol   and soil name   	Depth   (inches)   	Kw	   Kf	   <b>T</b>	erodi-   bility   group	erodi-   bility   index
	į		<u> </u>		<u> </u>	<u> </u>
433572:   Herbster	0-5   5-10   10-13		.37     .37     .37	5	   5 	   56 
	13-28   28-33   33-55   55-80	.24 .32 .32	.37   .24     .32     .32		     	       
433573: I			 		 	 
Cornucopia              	0-3   3-10   10-32   32-45   45-50   50-72	.24 .24 .24	.43     .43     .24     .24     .24	5	5 	56   
433582:	i i		i i	_		
Croswell        	0-1   1-7   7-16   16-39   39-60	.02	.02     .02     .02     .02	5   	1       	220       
433599:	i		! 		! 	! 
Annalake            	0-3   3-6   6-17   17-31   31-39   39-60	.24	.28     .24     .24     .24     .24	5	3 	86       
433600:	l I		 		 	 
Annalake              	0-3   3-6   6-17   17-31   31-39   39-60	.24	.28     .24     .24     .24     .24	5	3         	86 
433671:				_		
Arnheim          	0-5   5-10   10-15   15-24   24-60	.37	.37     .37     .37     .37	5   	8 	0 
433676:   Redrim	0-1   1-3	.02	.02     .02	2	 	 
 	3-11   11-18   18-80	.02 .05 	.02     .17   		 	 
433679:   Lapoin            	0-1   1-4   4-7   7-19   19-34   34-39   39-80	.02 .32 .32 .24 .24		3	   5       	56   

Table 16.—Erosion Properties—Continued

<u> </u>	<u> </u>	Ero	Wind	Wind		
Map unit symbol   and soil name   	Depth   (inches)	Kw	   Kf   	T	erodi- bility group	erodi-   bility   index
433686:   Zeba	0-2   2-5   5-13   13-21   21-33   33-80	.24 .24 .24 .24		i	2	   134       
433729:	0-2   2-6   6-18   18-25   25-43   43-60	.02 .15 .15 .15	.02     .02     .02     .15     .15     .15	i !	1	   220       
433739:   Moquah          	0-5   5-19   19-48   48-55   55-60	.24 .24 .37	.28     .28     .24     .24     .37	į	3	   86     
433771.   Beaches						 
433802.   Udorthents, ravines   and escarpments						 
452739.   Water   	 		 	 		 
452765:   Abbaye            	0-2   2-4   4-13   13-25   25-32   32-80	.24 .17 .24	.02     .24     .17     .24     .24	į	3	   86         
   Lapoin                  	0-1   1-4   4-7   7-19   19-34   34-39   39-80	.32	.02     .32     .32     .24     .24     .28	3	5	   56         
1383557:	0-2   2-5   5-8   8-16   16-28   28-60	.10		5   5         	2	   134         
1383580:   Loxley  	0-13   13-60		.02     .02     .02	3   3   	8	   0 

Table 16.—Erosion Properties—Continued

		Ero	sion factor	rs	•	Wind
Map unit symbol	Depth				•	erodi-
and soil name	(inches)	Kw	Kf	l T		bility
		<u> </u>	!	<u> </u>	group	index
1383580:		İ	1	 	 	 
Beseman	0-36	.02	.02	l 2	ı I 8	i 0
1	36-60		.43	' - I	i	i
i		i	i	İ	İ	i
Dawson	0-8	.02	.02	2	8	0
1	8-38	.02	.02	l	l	I
1	38-40	.37	.37	l	l	I
1	40-60	.15	.15	l	I	I
1383581:		] 	1	 	  -	1
Rifle	0-4	ı I .02	.02	I I 3	ı I 8	I 0
KILLE	4-60		.02	, ,		1
i	1 00	1 .02	1 .02	' 	i I	i
1383603:	i	İ	i	İ	i	i
Cornucopia	0-3	.43	.43	J 5	J 5	56
1	3-10	.43	.43	l	l	I
1	10-32	.24	.24	l	l	I
1	32-45		.24	l	l	I
1	45-50		.24	l	l	I
!	50-72	.24	.24	l ·	!	1
1383658:		] 	1	 	  -	1
Deerton	0-1	.02	.02	ı I 3	ı I 8	i 0
1	1-9		.02	i	i	i
i	9-10	•	.15	I	i İ	i
i	10-25	•	.15	I	I	i
i	25-39		i	I	İ	İ
İ.	39-80			ĺ	l	İ
D		1	1	l	l	I
Brownstone	0-2		.02	] 3	8	1 0
!	2-12		.02	!	!	!
!	12-15 15-23	•	.17   .15	!	! !	!
;	23-33		.15	! !	l I	! !
i	33-80	l	.15	! 	! 	! !
i		İ	i	I	i	i
1383660:				ļ	ļ <u>-</u>	
Deerton	0-1	.02	.02	. 3	. 8	] 0
!	1-9		.02	  -	  -	!
!	9-10		.15   .15	 	  -	1
	10-25 25-39	l	.15 	 	 	1
;	39-80	, I		! 	! 	! !
i		i	i	i	i i	i
Brownstone	0-2			3	8	0
1	2-12		.02	I	l	I
1	- '		•	I	l	I
!			.15	<u> </u>	<u> </u>	!
!			.15	  -	 :	!
	33-80	 		 	 	I I
1383662:		! 	i	' 	i I	i
Abbaye	0-2	.02	.02	,   3	2	134
i	2-4		.15	I	I	I
İ	4-13		.17	I	I	I
İ	13-25	.24	.24	I	I	I
1	25-32	.24	.24	l	l	I
1	32-80			l	l	I
 	32-80	 	 	 	 	 

Table 16.—Erosion Properties—Continued

		Eros	sion factor	s	•	Wind
Map unit symbol   and soil name	Depth   (inches)	Kw	   Kf	т	erodi-   bility	erodi-   bility
	(Inches)	I/W			group	index
1383665:	l I		 		] [	 
Allendale	0-3 i	.10	.10	4	2	134
1	3-10	.02	.02		I	I
1	10-13	.02	.02		l	I
1	13-26	.02	.02		l	I
I	26-28	.02	.02		l	I
1	28-34		.28		l	I
1	34-60	.28	.28		 	 
Wakeley	0-4		.02	4	8	0
1	4-23		.17		l	I
1	23-28		.17		l	I
	28-80   I		.32   		 	 
Kinross	0-6	.02	.02	5	8	i 0
1	6-10		.02	١	l	I
1	10-12		.02		l	I
ļ.	12-24		.02			1
	24-42   42-60		.02     .02		 	 
1383960:	İ			į	 	İ
Flink	0-2	.02	.02	5	   1	220
1	2-3	.02	.02		l	I
1	3-6	.02	.02		l	I
1	6-9 I	.15	.15		l	I
1	9-26	.15	.15		l	I
1	26-35		.15		l	I
1	35-46		.15		l	I
	46-52   52-80		.32     .32		<b> </b> 	 
1444357	į		İ		İ	İ
1444357:   Arnheim	0-5 I	.37	1	5	l I 8	I I 0
Armeim	5-10 I	_	.37     .37	5	) °	1 0
;	10-15		.37     .37		l I	 
;	15-24	_	.37 I		! 	1
i	24-60	_	.37			İ
1444359.	l I		 		] [	 
Beaches	į		i	į		į
1444367:	l I				<b> </b> 	 
Udorthents, ravines   and escarpments	I I		 	İ	 	 
1444378:	l I			I	 	 
Wakefield	0-4	.28		3	   3	I 86
i.	4-7	.28	.28	i	İ	İ
i.	7-18 i		.37	i	İ	İ
İ	18-24	.37	.37	j	l	İ
1	24-36	.37	.37		l	I
1	36-49	.37	.37		l	I
1	49-64	.37	.37		] I	 
1444379:	 		·		' 	i I
Wakefield	0-4	.28	.28	3	] 3	l 86
ļ.	4-7		.28		l	!
!	7-18	.37	.37		l	1
ļ.	18-24   24-36		.37     37		] 	1
	24-36   36-49	.37 .37	.37     .37		 	I I
	49-64 I	.37			! 	I
i		.5,	<i>,</i>			i i

Table 16.—Erosion Properties—Continued

	I	Ero	sion factor	•	Wind	
Map unit symbol	Depth					erodi-
and soil name	(inches)	Kw	Kf   	T	bility   group	bility   index
   1444388:	 		 		] 	 
Allendale	0-3 I	.10	.10	4	2	134
1	3-10	.02	.02		1	l
1	10-13	.02	.02		1	l
1	13-26	.02	.02			l
1	26-28	.02	.02			l
1	28-34		.28			l
!	34-60	.28	.28   		] 	 
.444402:	i		i i			İ
Tonkey	0-8 I	.24	.24	5	] 3	l 86
I	8-14		.24		l	l
I	14-28		.24			l
1	28-60   I	.24	.24   			 
.444410:	i		i i			i
Tula	0-1	.02	.02	4	] 3	l 86
!	1-5		.28			!
!	5-8		.24			! :
!	8-20   20-28		.24			! !
	20-28   28-37		.24     .37		l	! !
	37-62		ı .37 I		]	l I
i	62-80		.37			! 
   444414:	ļ		 		<b> </b> 	 
Lupton	0-65	.02	.02	3	8	0
   Cathro	0-28	.02	l .02 l	2	l I 8	l I 0
Cacinio	28-49			-		
i	49-60		.28			İ
  Tawas	0-31	.02	l .02 l	2	l I 8	l I 0
	31-60		.15	-	İ	İ
444425:	ļ		 			 
Lerch	0-3 i	.02	.02	5	4	I 86
i	3-7		.20	-		
i	7-12 i		.28		Ì	I
i i	12-29	.28	.28	Ì	l	I
1	29-56 I	.28	.28		l	l
1	56-80	.24	.24		]	 
Herbster	0-5	.37	.37	5	5	   56
1	5-10		.37		l	I
1	10-13		.37			l
1	13-28		.24			l
I	28-33	. 32	.32		l	I
I	33-55	.32	.32		!	!
1	55-80   	.24	.24   		] 	 
444426:	i		i i		İ	i
Portwing	0-4	. 43	.43	5	5	56
I	4-9	. 37	.37			l
I	9-32	.24	.24			!
	32-51	.24	.24			I
!	51-80		24			:

Table 16.—Erosion Properties—Continued

		Ero	sion factor	s	•	Wind
Map unit symbol	Depth					erodi-
and soil name	(inches)	Kw	Kf	Т	bility	bility
!			!	<u> </u>	group	index
1444426:			! !	 		 
Herbster	0-5	.37	.37	5	5	I 56
i i	5-10 i	.37	.37	İ	l	İ
i	10-13	.37	.37	i	İ	i
i	13-28	.24	.24	i	İ	i
i	28-33	.32	.32	i	İ	i
i	33-55	.32	.32	i I	i	i
i	55-80	.24	.24		İ	İ
	!		!!!		]	!
1444427:     Cornucopia	0-3 I	.43	I .43	l I 5	l I 5	I I 56
COINGCOPIA	3-10	.43	1 .43	, ,	, ,	1 30
;	10-32	.24	1 .24	l I	]	! !
;	32-45	.24	.24	l I	]	! !
	45-50 I	.24	.24	l i	1	!
	50-72	.24	.24	 		<u>.</u>
į			i i			i I
1444428:	1			_	_	
Cornucopia	0-3	.43	.43	5	5	56
1	3-10	.43	.43			I
1	10-32	.24	.24			I
1	32-45	.24	.24			I
1	45-50 I	.24	.24			I
ļ	50-72	.24	.24			l
1444431:			! !			! 
Croswell	0-1	.02	.02	5	1	220
1	1-7	.02	.02	1	1	I
1	7-16	.02	.02	1	1	I
1	16-39	.02	.02	1	1	I
I	39-60	.02	.02	1	l	I
1444432:			I		İ	 
Gogebic	0-1	.02	.02	4	, J 3	ı I 86
GOGEDIC	1-5	.28	1 .28	, <del>-</del>	, ,	1 00
;	5-7	.28	1 .28	! ]	]	! !
;	7-17	.28	1 .28	! ]	]	! !
;	17-26	.28	1 .28	! 1	] ]	! !
;	26-36	.37	.37	! 1	] ]	! !
;	36-53 I	.37	.37     .37	l I	]	! !
;	53-71	.37	.37     .37	l I	]	! !
	71-80	.37	.37	 		! !
i	i		i		İ	i İ
1444435:				_		
Iosco	0-7	.10	1 .10	5	2	134
1	7-9	.17	.17			I
1	9-11	.17	.17			I
1	11-28	.15	.15			I
1	28-34	.15	.15		l	I
1	34-40	.37	.37			I
	40-60	.37	.37	] I	] I	 
1444457:			i   	 	 	! 
Redrim	0-1	.02	.02	2	8	,   0
i.	1-3	.02	.02			I
i	3-11	.02	.02			İ
i	11-18	.05	.17		l	I
i	18-80		i i		1	I

Table 16.—Erosion Properties—Continued

<del></del>		Ero	sion factor	rs	Wind	Wind
Map unit symbol   and soil name	Depth (inches)	   Kw 	   Kf 	   T 	erodi-   bility   group	erodi-   bility   index
	0-2 2-5 5-13 13-21 21-33 33-80	.24	.24   .24   .24   .24   .24	   3       	   2     	   134       
1444460:		! 			! 	! 
Abbaye          	0-2 2-4 4-13 13-25 25-32 32-80	1 .17	.02   .24   .17   .24   .24	] 3 	3         	86         
Lapoin                	0-1 1-4 4-7 7-19 19-34 34-39 39-80	.32   .24   .24	.02   .32   .32   .24   .24   .28	3   	5         	   56           
   1444461:   Abbaye              	0-2 2-4 4-13 13-25 25-32 32-80	1 .17	   .02   .24   .17   .24   .24	   3       	   3     	   86   86     
   Zeba              	0-2 2-5 5-13 13-21 21-33 33-80	.24	.24   .24   .24   .24   .24	   3     	   2       	   134         
1444477:   Cublake            	0-3 3-4 4-23 23-32 32-40 40-48 48-60	.15		5   	   1     	   220           
Croswell	0-1 1-7 7-16 16-39 39-60	.02   .02   .02	.02   .02   .02   .02   .02	   5     	   1   	   220       
	12-32 32-45 45-62	.17   .17   .28   .28	.17   .17   .28   .28	4 		   220             

Table 16.—Erosion Properties—Continued

<u> </u>	Erosion factors			•	Wind	
Map unit symbol	Depth		<u> </u>			erodi-
and soil name	(inches)	Kw	Kf K	T	bility	bility
			<u> </u>	<u> </u>	group	index
1444478:			! !	l 1	 	 
Cublake	0-3	.02	I .02	I I 5	   1	ı I 220
Cubiake	3-4		.02     .17		±	220 
i i	4-23		.17     .15	•	! 	! I
i	23-32		1 .15	•	' 	! 
i	32-40		.15		' 	
i	40-48		.15	•	I	<u> </u>
i	48-60		.32	•	I	<u> </u>
i	-5 55			i	i i	i
Croswell	0-1	.02	.02	I 5	i 1	220
i	1-7 i		.02	i	I	i
i	7-16 i		.02	i	I	i
i	16-39		.02	i	I	i
i	39-60		.02	i	I	i
i			i	•	İ	i i
Ashwabay	0-4		.10	•	1	220
i	4-5		.17	•		
i	5-12		.17	•	I	I
i	12-32		.17	•	I	I
i	32-45		.17	•	i İ	i
i	45-62		.28	i	i İ	i i
i	62-80		.28	i	i İ	i i
i			i	i	İ	i i
1444479:	i		i i	i	İ	İ
Morganlake	0-4	.10	.10	5	2	134
i	4-8	.17	.17	i	i	İ
i	8-26	.17	.17	i	i	İ
i	26-31		17	•	I	i
i	31-40		. 43	i	I	i
i	40-60		. 43	i	I	i
i	i		j	İ	İ	İ
1444480:	ı		<b>I</b> 1	l	l	I
Morganlake	0-4	.10	.10	5	2	134
1	4-8	.17	.17	l	l	l
1	8-26	.17	.17	l	l	I
1	26-31	.17	.17	l	l	I
1	31-40	.43	.43	l	l	I
1	40-60 I	.43	.43	l	l	l
1	1		<b>I</b> 1	l	l	l
1444481:	I			l	l	l
Kellogg	0-2	.02	.02	4	1	220
1	2-6	.02	.02	l	l	l
1	6-26		.15	l	l	l
1	26-29	.32	.32	l	l	l
1	29-40	.32	.32	l	l	l
1	40-80	. 32	.32	l	l	I
1			<b>I</b> 1	l	l	l
Allendale	0-3		.10	4	2	134
1	3-10		.02	l	l	l
1	10-13		.02	l	l	l
1	13-26		.02	l	l	l
1	26-28		.02	l	l	l
1	28-34		.28	l	l	l
1	34-60	.28	28		ļ	!
7.2				l .	!	1 222
Ashwabay	0-4		.10	4	1 :	220
1	4-5		.17		! :	l
1	5-12		.17		! :	l
1	12-32		.17		l	<u> </u>
1	32-45		.17	•	l	l
i	45-62	.28	.28	l	l	l
'	62-80	.28	.28			

Table 16.—Erosion Properties—Continued

	ı	Ero	sion factor	rs	•	Wind
Map unit symbol	Depth		l ====	l		erodi-
and soil name	(inches)	Kw	Kf	T		bility
	<del></del>	<u> </u>	<u> </u>	<u> </u>	group	index
1444482:	· ·		! !	! 	! 	! !
Kellogg	0-2 i	.02	.02	4	1	220
i	2-6 j	.02	.02	İ	İ	i
i	6-26 I	.15	.15	l	İ	İ
1	26-29	. 32	.32	I	l	I
1	29-40	. 32	.32	I	l	I
į.	40-80	.32	.32	l	ļ	I
Allendale	0-3 I	.10	I I .10	l I 4	l I 2	I I 134
Allendale	3-10		•	, <del>-</del>	, <u>-</u> I	1 134
i	10-13		•	' 	' 	i
i	13-26		•	' 	I	i
i	26-28		•	' 	' 	i
i	28-34		•	' 	' 	i
i	34-60		•	' 	i I	İ
1			I .	l	l .	1
Ashwabay	0-4		•	4	1	220
!	4-5		•	!	! :	!
!	5-12		•	!	  -	!
	12-32		•	!	  -	!
l I	32-45		•	<u> </u>	! !	!
	45-62   62-80		•	!	! !	!
<u> </u>	62-80	.20	.28 	 	! 	! !
1444486:	i		i	i İ	i	i
Sedgwick	0-5 I	.28	.28	3	] 3	l 86
1	5-8 I	.24	.24	l	l	I
1	8-16		.28	l	l	I
1	16-19			l	l	I
1	19-53			l	l	I
!	53-80	.28	.28	l	<u> </u>	
Munuscong	0-8 I	.28	ı I .28	I I 4	I I 3	ı I 86
i	8-30 I	.24	.24	I	i	i
i	30-60	.28	•	I	İ	i
1444407	!		I .	  -	<u> </u>	!
1444487:     Superior	0-3 I	.37	I I .37	I I 3	l I 3	I I 86
i i	3-6 I		•	İ	i	1
i	6-14		•	' I	i i	i
i	14-19 i		28	I	I	i
i	19-26 i	.28	28	I	I	i
i	26-60 I	.28	.28	İ	İ	İ
Sodowi ok	0-5 I	10	10	3		
Sedgwick	0-5   5-8		.10   .24	] 3	] 3	86
				!	! !	!
	8-16   16-19			 	 	1
	19-53		.43	 	 	1
<u> </u>	53-80	.28	.28	 	! 	! 
į	i		İ	İ	İ	İ
1444488:	0.3	27				
Superior	0-3   3-6	.37	.37	] 3	] 3	86
!	3-6   6-14		.28	l I	I I	1
			•	 	I I	1
!	14-19		.28   .28	 	I I	1
!	19-26   26-60			I I	I I	1
1	26-60 I			I 	!	!

Table 16.—Erosion Properties—Continued

Map unit symbol   Depth	<u>-</u>		Ero	sion facto	rs	Wind	Wind
1444488:  Sedgwick			Kw	   Kf 	   T 	bility	bility
0-5	i			İ	i I	l =====	<u> </u>
	•			•	   3	l   3	   86
16-19   .43   .4	1			•	•	l	l
19-53   .28   .28   .28				•	•	! 	! 
1444489:  Sultz	i			•	i i	i	i i
Sultz	!	53-80	.28	. 28	ļ	! :	!
Sultz	1444489:			! !	 	l I	l I
6-18   .15		0-2	.02	.02	5	1	220
18-25	1			•	•	I	I
25-43	!				•	<u> </u>	! :
Ashwabay				•	 	  -	 
4-5					! 	i İ	i İ
4-5	!			1	!	l	!
5-12	Ashwabay			•	•	1 	220 
12-32	!			•	•	I	I
45-62	i			•	•	I	i I
Rubicon	i	32-45	.17	.17	İ	İ	İ
Rubicon	1				l	I	I
1-6	ļ	62-80	.28	.28	 	 	 
6-18	Rubicon	0-1	.02	.02	, J 5	,   1	,   220
18-36   .10   .15	1				l	l	l
1444492:	!			•	!	<u> </u>	<u> </u>
1444492:					! !	I I	I I
Manistee	i	1		i	i	İ	i
3-11	•	0-3	02	1 02	l 1 1	   1	220
11-28   .02   .02	Manifolde			•	•	, ± 	220 
30-38   .32   .32	i			•	•	i	i
38-60   .32   .32	1	28-30	.02	.02	I	l	l
Kellogg	!				l	<u> </u>	<u> </u>
2-6		38-60	. 32	.32 	 	l I	l I
6-26	Kellogg	0-2	.02	•	4	1	220
26-29   .32   .32	!			•	•	l	l
29-40				•			<u> </u>
Ashwabay	-				l I	l I	l I
Ashwabay	i				i	İ	i
4-5	A sharehouses	0.4			4	   1	220
5-12   .17   .17	Ashwabay				•	<u>+</u>	220 
12-32   .17   .17	i				i I	i I	i I
45-62   .28   .28	i				I	İ	İ
62-80   .28   .28	1				l	I	I
	l				 	 	 
Keweenaw     0-2           .10           5           2           134             2-4           .17           .24                                     4-16           .17           .24                                     16-20           .17           .24	i	02 00	.20	.20	! 	İ	i I
2-4   .17   .24					! _	l .	1
4-16   .17   .24           16-20   .17   .24	Keweenaw				j 5	1 2 1	134
16-20   .17   .24					! 	! 	! 
	i				I	i	i
	i				I	I	I
27-43   .17   .24	1				ļ	! :	<u> </u>
43-75   .17   .24	ļ				 	l	l
75-80   .17   .17					•	! 	! 

Table 16.-Erosion Properties-Continued

	······I	Erosion factors			Wind	Wind
Map unit symbol   and soil name	Depth   (inches)	Kw	   Kf	   T 		erodi-   bility   index
1444506:			 		1	 
Rubicon	0-1	.02	.02	5	1	220
1	1-6	.02	.02			l
1	6-18	.02	.02			l
1	18-36	.02	.02			l
!	36-60 I	.02	.02			l
1444507:			! !			l i
Keweenaw	0-2 I	.10	1 .10	l 5	2	I 134
i	2-4	.17	.24		_	i
i	4-16 i	.17	.24		j	i
1	16-20	.17	.24			l
1	20-27	.17	.24			l
1	27-43	.17	.24			l
!	43-75	.17	.24			l
1	75-80	.17	.17			l I
Rubicon	0-1 I	.02	I .02	l 5	1	ı   220
1	1-6	.02	.02		, <u>-</u>	 I
i	6-18 i	.02	.02			İ
İ	18-36 I	.02	.02			l
I	36-60 I	.02	.02			I
1444505	!		! !			
1444585:   Meehan, beaches	0-4 I	.02	l .02	l I 5	1	l I 220
Meenan, beaches	4-29	.15	.02     .15	] 3	. ±	220 
i	29-60	.15	1 .15			! 
i	-5 00	0	, 			İ
1444586:	I		<b>I</b>			l
Wurtsmith, beaches	0-1			5	1	220
1	1-4	.02	.02			l
!	4-24	.15	.15			l
1	24-48   48-80	.15 .15	.15     .15			l I
i	1000	.13	I .13			! 
1444587:	i		i i			i
Grayling, beaches	0-3 I	.02	.02	5	1	220
1	3-15	.15	.15			l
1	15-23	.15	.15			l
!	23-60	.15	.15			l
1529830:	;		! !	 		l I
Meehan, beaches	0-4	.02	.02	5	1	l 220
i	4-29	.15	.15		_	i
1	29-60 I	.15	.15			l
1	I		l I			l
1700372:	2.12	0.0				1
Loxley	0-13	.02	.02	] 3	8	0
<u> </u>	13-60	.02	.02			l I
Beseman	0-36 I	.02	   .02	2	l 8	I I 0
1	36-60	.43	.43	_	i	i
i	i		ı	ı	ı	I
Dawson	0-8	.02	.02	2	8	0
1	8-38	.02	.02			<u> </u>
!	38-40	.37	.37			l
	40-60	.15	.15		1	 
1700373:	! !					i I
Rifle	0-4	.02	.02	3	8	0
i	4-60 I	.02	.02	ı	1	I
						•

Table 16.—Erosion Properties—Continued

		Erosion factors			•	Wind	
Map unit symbol   and soil name	Depth (inches)	   Kw	   Kf 	   T 	•	erodi-   bility   index	
1700374:			1	1	 	 	
Allendale	0-3 3-10 10-13 13-26 26-28 28-34 34-60	.02	.10   .02   .02   .02   .02   .02   .28	4   4     	2   	134   134       	
Wakeley      	0-4 4-23 23-28 28-80		.02   .17   .17   .32	   4     	   8   	   0     	
Kinross            	0-6 6-10 10-12 12-24 24-42 42-60	.02	.02   .02   .02   .02   .02   .02	   5         	   8     	   0         	
1702605:			İ	İ	İ	İ	
Menominee          	0-4 4-7 7-23 23-39 39-59 59-80	.10 .17 .17 .28 .32	.10   .17   .17   .32   .37	5         	2 	134         	
1702606:			 	! 	l I	i	
Deerton	0-1 1-9 9-10 10-25 25-39 39-80	.02 .02 .15 .15 	.02   .02   .15   .15 	3   3 	8 	0 	
Brownstone            	0-2 2-12 12-15 15-23 23-33 33-80		.02   .02   .17   .15   .15	   3       	   8     	   0       	
1702607:			 	 	 	 	
Deerton	0-1 1-9 9-10 10-25 25-39 39-80	.02 .02 .15 .15	.02   .02   .15   .15 	3 	8 	0 	
   Brownstone  	0-2 2-12 12-15 15-23 23-33 33-80	.02 .02 .10 .10	.02   .02   .17   .15   .15	   3           	   8         	   0             	

Table 16.—Erosion Properties—Continued

	ı	Eros	sion fact	ors	Wind	Wind
Map unit symbol	Depth			T	erodi-	erodi-
and soil name	(inches)	Kw	Kf	T	bility	bility
	<u>.</u>		<u> </u>	1	group	index
1702608:	¦		] 			 
Abbaye	0-2	.02	.02	3	2	134
	2-4	.15	.15	1	]	I
į	4-13	.17	.17	i	]	İ
j	13-25	.24	.24	i	]	İ
j	25-32	.24	.24	i	]	İ
į	32-80			İ		İ
1711685:	¦		] 			 
Cublake	0-3 I	.02	.02	5	1	220
j	3-4	.17	.17	i	]	İ
į	4-23	.15	.15	i	]	İ
I	23-32	.15	.15	1	]	I
I	32-40	.15	.15	1	]	I
I	40-48	.15	.15	1	]	I
!	48-60	.32	.32	1	!	ļ
Keweenaw	0-2 I	.10	l I .10	I 5	l l 2	l I 134
i	2-4	.17	.24	i	İ	i
i	4-16 i	.17	.24	i i	İ	i
i	16-20	.17	.24	i		i
i	20-27	.17	.24	i		i I
i	27-43	.17	.24	i		i İ
i	43-75 I	.17	.24	i		i I
i	75-80 I	.17	.17	i		İ
i	i	i	ĺ	j		İ

## Table 17.-Total Soil Carbon

(This table displays soil organic carbon (SOC) and soil inorganic carbon (SIC) in kilograms per square meter to a depth of 2 meters or to the representative top depth of any kind of bedrock or any cemented soil horizon. SOC and SIC are reported on a volumetric whole soil basis, corrected for representative rock fragments indicated in the database. SOC is converted from horizon soil organic matter of the fraction of the soil less than 2 mm in diameter. If soil organic matter indicated in the database is NULL, SOC is assumed to be zero. SIC is converted from horizon calcium carbonate content fraction of the soil less than 2 mm in diameter. If horizon calcium carbonate indicated in the database is NULL, SIC is assumed to be zero. A weighted average of all horizons is used in the calculations. Only major components of a map unit are displayed in this table)

Map unit symbol, component name, and component percent	   soc 	   SIC 
	  kg/m <sup>2</sup>	   kg/m <sup>2</sup>
433292: Lerch (50%)	   15	     21
Herbster (35%)	l   9	l   8
433296: Cublake (35%)	 	 
Croswell (20%)	l   6	I I 0
Ashwabay (20%)	1 11	l   0
433299: Cublake (35%)	     11	     0
Croswell (20%)	   6	)   0
Ashwabay (20%)	1 11	)   0 
433300: Kellogg (35%)	     12	     8
Allendale (25%)	l   6	I   8
Ashwabay (20%)	1 11	)   0
433301: Kellogg (40%)	     12	     8
Allendale (25%)	   6	,   8 
Ashwabay (20%)	1 11	)   0 
433304: Sedgwick (50%)	     10	     32
Munuscong (30%)	1   7	   27
433305: Superior (50%)	     6	     21
Sedgwick (30%)	1   10 	   32 

Table 17.—Total Soil Carbon—Continued

	<u> </u>	
Map unit symbol, component name, and component percent	SOC	SIC
	  kg/m <sup>2</sup>	kg/m <sup>2</sup>
433309: Superior (50%)	 	21
Sedgwick (30%)	1 10	32
433310: Sultz (35%)	 	4
Ashwabay (25%)	1 11	0
Rubicon (20%)	   7	0
433314: Manistee (40%)	 	16
Kellogg (30%)	1 12	7
Ashwabay (20%)	   11   	0
433326: Rubicon (85%)		0
433379: Allendale (80%)	 	8
433515: Lupton (40%)	       147	0
Cathro (30%)	1 112	0
Tawas (25%)	72     72	0
433572: Portwing (50%)	 	18
Herbster (30%)	] 9	8
433573: Cornucopia (80%)	 	17
433582: Croswell (82%)	         	0
433599: Annalake (85%)	 	0
433600: Annalake (80%)	 	0
433671: Arnheim (85%)		0
433676: Redrim (85%)		0
433679: Lapoin (85%)	         9	4
433686: Zeba (90%)		0

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	soc     soc   	sic
	   <u>kg/m<sup>2</sup></u>	kg/m <sup>2</sup>
433729: Sultz (85%)	   12	4
433739: Moquah (85%)	14   	8
433771: Beaches (97%)		0
433802: Udorthents, ravines and escarpments (85%)	 	0
452739: Water (100%)	 	0
452765: Abbaye (55%)	 	0
Lapoin (40%)	9	4
1383557: Au Gres (85%)	 	0
1383580: Loxley (40%)	 	0
Beseman (30%)	51	0
Dawson (28%)	1 119	0
1383581: Rifle (90%)	       105	0
1383603: Cornucopia (80%)	 	17
1383658: Deerton (50%)	 	0
Brownstone (40%)	9	0
1383660: Deerton (50%)	 	0
Brownstone (40%)	9	0
1383662: Abbaye (90%)	         9	0
1383665: Allendale (35%)	 	8
Wakeley (30%)	1 11	44
Kinross (20%)	   22	0
1383960: Flink (75%)	 	0

Table 17.—Total Soil Carbon—Continued

	soc     soc   	
	   <u>kg/m<sup>2</sup></u>	kg/m <sup>2</sup>
1444357: Arnheim (85%)	   19	0
1444359: Beaches (97%)	   0	0
1444367: Udorthents, ravines and escarpments (85%)	 	0
1444378: Wakefield (85%)	 	0
1444379: Wakefield (85%)	 	0
1444388: Allendale (80%)	 	8
1444402: Tonkey (90%)	 	8
1444410: Tula (80%)	 	0
1444414: Lupton (40%)	 	0
Cathro (30%)	   112	0
Tawas (25%)	   72	0
1444425: Lerch (50%)	       15	21
Herbster (35%)	   9	8
1444426: Portwing (50%)	 	18
Herbster (30%)	9	8
1444427: Cornucopia (80%)	 	17
1444428: Cornucopia (80%)	 	17
1444431: Croswell (82%)	 	0
1444432: Gogebic (85%)	 	0
1444435: Iosco (85%)	 	22
1444457: Redrim (85%)		0

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	   soc   	   SIC 
	  kg/m <sup>2</sup>	kg/m <sup>2</sup>
1444459: Zeba (90%)	,     3	     0
1444460: Abbaye (55%)	   9	0
Lapoin (40%)	   9	4
1444461: Abbaye (55%)	     9	     0
Zeba (40%)	   3	0
1444477: Cublake (35%)	     11	     0
Croswell (20%)	6	0
Ashwabay (20%)	1 11	0
1444478: Cublake (35%)	 	0
Croswell (20%)	I I 6	0
Ashwabay (20%)	   11	0
1444479: Morganlake (85%)	     7	     19
1444480: Morganlake (85%)	     7	     18
1444481: Kellogg (35%)	     12	     8
Allendale (25%)	l   6	8
Ashwabay (20%)	   11	0
1444482: Kellogg (40%)	     12	     8
Allendale (25%)	   6	8
Ashwabay (20%)	   11	0
1444486: Sedgwick (50%)	     10	     32
Munuscong (30%)	   7	27
1444487: Superior (50%)	     6	21
Sedgwick (30%)		   32 

Table 17.—Total Soil Carbon—Continued

Map unit symbol, component name, and component percent	soc     soc   	sic
	  kg/m <sup>2</sup>	kg/m <sup>2</sup>
1444488: Superior (50%)	 	21
Sedgwick (30%)	1 10	32
1444489: Sultz (35%)	 	4
Ashwabay (25%)	1 11	0
Rubicon (20%)		0
1444492: Manistee (40%)	 	16
Kellogg (30%)	1 12	7
Ashwabay (20%)		0
1444506: Keweenaw (60%)	       5	0
Rubicon (30%)	4	0
1444507: Keweenaw (60%)	 	0
Rubicon (30%)	4	0
1444585: Meehan, beaches (90%)		0
1444586: Wurtsmith, beaches (90%)		0
1444587: Grayling, beaches (95%)	 	14
1529830: Meehan, beaches (90%)	             5	0
1700372: Loxley (40%)	       181	0
Beseman (30%)	51	0
Dawson (28%)		0
1700373: Rifle (90%)		0
1700374: Allendale (35%)	 	8
Wakeley (30%)		44
Kinross (20%)	   22	0
1702605: Menominee (85%)		30

Table 17.-Total Soil Carbon-Continued

Map unit symbol, component name, and component percent	   SOC 	   SIC 
	   <u>kg/m<sup>2</sup></u>	   kg/m <sup>2</sup>
1702606:		' 
Deerton (50%)	7	0
Brownstone (40%)	   9	I I 0
1702607: Deerton (50%)	 	 
Brownstone (40%)	   9	I I 0
1702608: Abbaye (90%)	     9	     0
1711685: Cublake (50%)	     11	)     0
Keweenaw (30%)	l   5	I I 0
	I	l

Table 18.—Chemical Soil Properties

(Absence of an entry indicates that data were not estimated)

Map unit symbol and soil name	Depth   	Cation- cxchange capacity	•	reaction	Calcium carbon- ate
	İ	i	capacity		
	In	meq/100 g	meq/100 g	pH	Pct
	ı —	ı ———	ı ———	ı — ı	
433292:	I	I	I	I I	
Lerch	0-3			5.1-6.5	0
	3-7   7-12	32.0-54.0	 	5.1-6.5	
	7-12   12-29	20.0-50.0  20.0-49.0	 	5.1-6.5     7.4-8.4	
	1 29-56	120.0-49.0	' 	7.4-8.4     7.4-8.4	
	56-80	3.0-14.0		7.4-8.4	
	İ	İ	İ	i i	
Herbster	I 0-5	6.0-40.0		5.1-7.3	0
	5-10	4.0-35.0		5.1-6.5	-
	10-13	4.0-35.0	!	5.1-7.3	
	13-28   28-33	4.0-35.0  20.0-30.0		6.1-7.8     6.1-7.8	
	20-33   33-55	120.0-30.0	 	0.1-7.6     7.4-9.0	
	I 55-80	1.0-20.0	' 	7.4-8.4	
	, 55 55 I	1	i I		
433296:	İ	İ	İ	i i	
Cublake	I 0-3		1.0-10.0	3.5-6.0	0
	3-4		•	3.5-6.0	
	4-23		0.0-4.0	3.5-6.5	
	23-32	 	0.0-5.0	3.5-6.5	-
	32-40   40-48	 	0.0-5.0   0.0-5.0	3.5-7.3     3.1-7.3	
	I 48-60	1 2.0-20.0	I	5.1-7.3     5.1-7.3	
	10 00 	1	i I	3.1 7.3   	
Croswell	0-1	2.0-10.0		3.5-6.5	0
	1-7		1.0-5.0	3.5-6.5	0
	7-16		1.0-4.0	4.5-7.3	
	16-39		1.0-3.0	4.5-7.3	
	39-60	1.0-2.0		5.1-8.4   	
Ashwabay	I 0-4	5.0-10.0	! 	   5.1-6.5	
	4-5	2.0-4.0		1 4.5-6.5	
	5-12	i	2.0-4.0	4.5-6.0	0
	12-32	2.0-4.0		5.6-7.3	0
	32-45	2.0-3.0		6.1-7.3	
	45-62	18.0-31.0		6.1-7.3	
	62-80	1.0-31.0		6.1-7.3	0
433299:	! !	1	! !	! !	 
Cublake	0-3	· 	1.0-10.0	3.5-6.0	0
	3-4	i	0.0-10.0	3.5-6.0	0
	4-23		0.0-4.0	3.5-6.5	0
	23-32		•	3.5-6.5	
	32-40			3.5-7.3	
	40-48	   2.0-20.0	0.0-5.0 	3.1-7.3	
	48-60 	2.U-2U.U	, I	5.1-7.3   	
Croswell	   0-1	2.0-10.0	! 	   3.5-6.5	
	1-7		•	3.5-6.5	
	7-16	i	•	4.5-7.3	
	16-39		1.0-3.0	4.5-7.3	
	39-60	1.0-2.0		5.1-8.4	0

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	   Depth     	exchange	Effective   cation-   exchange   capacity	reaction	  Calcium  carbon-   ate 
	In In	meq/100 g	meq/100 g	рН	Pct
433299: Ashwabay	     0-4	     5.0-10.0	 	     5.1-6.5	     0
	•	2.0-4.0		4.5-6.5	0
	•		2.0-4.0 	4.5-6.0   5.6-7.3	
	•	2.0-3.0	i	6.1-7.3	•
		18.0-31.0   1.0-31.0		6.1-7.3   6.1-7.3	•
	1	İ	i		i
433300: Kellogg	l l 0-2	 	  80.0-120.0	l I 3.6-5.5	l I 0
	2-6	i	1.0-5.0	4.5-6.0	
	6-26   26-29	  10.0-25.0	•	4.5-6.5   6.1-7.8	•
	•	110.0-25.0	i	6.1-7.8	•
	40-80	10.0-25.0		6.1-8.5	0-5
Allendale	   0-3	   4.0-20.0		   3.5-7.3	I I 0
	•	1.0-5.0		4.5-7.3	•
	•	1.0-5.0   1.0-5.0	•	4.5-6.0   4.5-6.5	
	•	1.0-5.0	i	4.5-7.3	•
	•	8.0-25.0   8.0-25.0	 	6.1-8.4   6.1-8.4	•
No. 10 and 10 an		I I = 0.10.0	!		İ
Ashwabay	•	5.0-10.0   2.0-4.0		5.1-6.5   4.5-6.5	•
	•	i		4.5-6.0	
	•	2.0-4.0   2.0-3.0	 	5.6-7.3   6.1-7.3	•
	•	118.0-31.0	i	6.1-7.3	•
	62-80	1.0-31.0		6.1-7.3	J 0
433301:	İ	İ	i	! 	İ
Kellogg	0-2   2-6		•	3.6-5.5   4.5-6.0	•
	2-0			4.5-6.5	
	•	10.0-25.0		6.1-7.8	
	•	10.0-25.0  10.0-25.0	 	6.1-7.8   6.1-8.5	•
211 4.1 .	1	1	!		İ
Allendale		4.0-20.0   1.0-5.0		3.5-7.3   4.5-7.3	•
		1.0-5.0	i	4.5-6.0	
		1.0-5.0   1.0-5.0	 	4.5-6.5   4.5-7.3	
	•	8.0-25.0	i	6.1-8.4	
	34-60	8.0-25.0		6.1-8.4	0-10
Ashwabay		5.0-10.0	· 	5.1-6.5	
		2.0-4.0 		4.5-6.5   4.5-6.0	0   0
		2.0-4.0	2.0-4.0	5.6-7.3	
		2.0-3.0	i	6.1-7.3	•
	•	18.0-31.0   1.0-31.0		6.1-7.3   6.1-7.3	
		İ	i i		İ

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation- exchange capacity	Effective   cation-   exchange   capacity	reaction	Calcium  carbon-   ate
,	In In	meq/100 g	meq/100 g	рн	Pct
433304:	İ	1	1		 
Sedgwick	I 0-5	6.0-20.0		I   4.5-7.3	I 0
	5-8	2.0-15.0	i	4.5-6.0	•
	8-16	4.0-20.0		4.5-6.0	•
	16-19	7.0-70.0		5.1-7.3	•
	19-53   53-80	7.0-70.0   7.0-70.0		7.4-9.0   7.4-9.0	
		İ	i	İ	i
Munuscong		5.0-15.0	!	6.1-7.8	•
		2.0-10.0  10.0-30.0		6.1-7.8   7.4-8.4	0   10-30
	30 00 	1	İ	7.4 0.4 	10 30 
433305:	l	I	I	I	l
Superior	0-3	3.0-15.0		5.1-7.3	•
	3-6   6-14	3.0-15.0 	2.0-15.0	5.1-7.3   4.5-6.0	•
		8.0-65.0	•	5.1-6.0	•
	19-26	8.0-65.0		5.1-7.3	0
	26-60	8.0-65.0		7.4-8.4	0-25
Sedgwick	I 0-5	   6.0-20.0		   4.5-7.3	I I 0
	5-8	2.0-15.0	i	4.5-6.0	0
		4.0-20.0		4.5-6.0	
	16-19	7.0-70.0		5.1-7.3	
	19-53   53-80	7.0-70.0   7.0-70.0	 	7.4-9.0   7.4-9.0	0-10   2-35
	55 66	1	i	, <i>,</i> , , , , , , , , , , , , , , , , ,	2 33
433309:			!	!	
Superior	0-3   3-6	3.0-15.0   3.0-15.0		5.1-7.3   5.1-7.3	
	3-0   6-14	5.0-15.0	2.0-15.0	1 4.5-6.0	•
		8.0-65.0		5.1-6.0	•
	19-26	8.0-65.0		5.1-7.3	•
	26-60	8.0-65.0		7.4-8.4	0-25
Sedgwick	I 0-5	   6.0-20.0		I   4.5-7.3	I I 0
	5-8	2.0-15.0	i	4.5-6.0	0
		4.0-20.0		4.5-6.0	
	16-19   19-53	7.0-70.0   7.0-70.0		5.1-7.3   7.4-9.0	•
	1 53-80	1 7.0-70.0		7.4-9.0   7.4-9.0	•
		i	i	i	İ
433310:		!	100 0 100 0	•	l
Sultz	0-2   2-6	1 1.0-6.0	80.0-120.0	3.6-7.3	
	6-18		•	3.6-6.5	
	18-25	1.0-6.0		5.1-6.5	0
		1.0-3.0		5.1-6.5	
	43-60 	1.0-15.0 	 	5.1-7.3 	0-10 
Ashwabay	0-4	5.0-10.0	· 	,   5.1-6.5	0
		2.0-4.0		4.5-6.5	
	5-12		2.0-4.0	4.5-6.0	
		2.0-4.0   2.0-3.0	 	5.6-7.3   6.1-7.3	
		18.0-31.0	· 	6.1-7.3	
		1.0-31.0	i	6.1-7.3	
	l	I	I	l	l

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	   Depth   	exchange capacity	exchange capacity	reaction	  Calcium  carbon-   ate 
	In In	meq/100 g	meq/100 g	PH	<u>Pct</u>
	l	I	I	l	l
433310:		!			!
Rubicon	0-1	 	1.0-6.0	4.5-6.0	0
	1-6   6-18	 	•	4.5-6.0   4.5-6.0	•
	1 18-36	' 		1 4.5-6.0	•
	36-60	1.0-2.0		4.5-7.3	•
	l	I	I	l	I
433314:	l	I	I	l _	I .
Manistee	0-3	5.0-15.0		4.5-7.3	•
		1.0-5.0   1.0-5.0	 	4.5-7.3   5.1-6.5	•
		1.0-5.0	' 	5.1-7.3	•
		110.0-25.0		5.1-7.3	•
	38-60	110.0-25.0		6.6-8.4	5-25
		I			
Kellogg	0-2   2-6			3.6-5.5   4.5-6.0	•
			•	4.5-6.0   4.5-6.5	
		110.0-25.0		6.1-7.8	•
		110.0-25.0	i	6.1-7.8	•
	40-80	10.0-25.0		6.1-8.5	0-5
			!		1
Ashwabay	•	5.0-10.0   2.0-4.0	 	5.1-6.5   4.5-6.5	
	•	2.0 4.0	•	1 4.5-6.0	•
		2.0-4.0		5.6-7.3	•
	32-45	2.0-3.0		6.1-7.3	0
	•	18.0-31.0		6.1-7.3	•
	62-80	1.0-31.0		6.1-7.3	. 0
433326:	l I	 	 		 
Rubicon	   0-1	' 	1.0-7.0	   4.5-6.0	, I 0
	1-6	i	•	4.5-6.0	•
	6-18		•	4.5-6.0	I 0
	18-36		0.0-4.0	4.5-6.0	•
	36-60	0.0-4.0		4.5-7.3	0
433379:	] ]	! !	! !	! !	l I
Allendale	0-3	4.0-20.0		3.5-7.3	i 0
	3-10	1.0-5.0		4.5-7.3	0
	10-13	1.0-5.0		4.5-6.0	•
	13-26	1.0-5.0		4.5-6.5	0
		1.0-5.0   8.0-25.0	 	4.5-7.3   6.1-8.4	
		8.0-25.0	 	6.1-8.4	
	<b></b>		i	 I	<del></del>
433515:	l	I	I	I	I
Lupton	0-65	160.0-190.0		4.5-7.8	. 0
Cathro	l I 0-28	  150.0-230.0	l I	   4.5-7.8	l I 0
Cacinio				1 5.6-7.3	
			i	5.6-7.3	•
	l	I	I	l	l
Tawas	•	160.0-190.0	•	4.5-7.8	
	31-60	1.0-7.0		5.6-8.4	0
	l	I	I	I	I

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth 	Cation-   exchange   capacity		reaction	  Calcium  carbon-   ate
	   In	meq/100 g	<del></del>	l pH	l Pct
İ	_	i	i	<u>-</u>	i —
433572:	0.4		1		l .
Portwing	0-4   4-9	6.0-40.0   4.0-35.0	 	4.5-7.3   5.1-7.3	
i		7.0-50.0		6.1-7.8	•
I		7.0-50.0		7.4-9.0	•
	51-80	1.0-15.0		6.1-8.4	0-10
Herbster	0-5	   6.0-40.0	 	ı   5.1-7.3	I 0
i	5-10	4.0-35.0	i	5.1-6.5	0
1		4.0-35.0		5.1-7.3	
		4.0-35.0  20.0-30.0		6.1-7.8   6.1-7.8	•
		120.0-30.0		7.4-9.0	•
i		1.0-20.0		7.4-8.4	•
		!	!	<u> </u>	l :
433573: Cornucopia	   0-3	   6.0-40.0	l I	l   4.5-6.5	I I 0
Colinacopia		4.0-35.0	' 	5.1-7.3	•
i	10-32	7.0-50.0		5.6-7.8	0-5
		7.0-50.0		7.4-9.0	•
	45-50   50-72	1.0-15.0   1.0-15.0	 	7.4-8.4   6.1-8.4	•
i		İ	i		İ
433582:		!			l
Croswell	0-1   1-7		2.0-11.0   1.0-9.0	3.5-6.5   3.5-6.5	•
	7-16	1 1.0-7.0		4.5-7.3	
i	16-39	0.0-6.0		4.5-7.3	
	39-60	0.0-4.0	I	5.1-8.4	0-10
433599:		 	! !	 	 
Annalake	0-3	i	6.0-17.0	4.5-6.0	0
1	3-6			4.5-6.0	
	6-17   17-31		5.0-13.0   4.0-12.0	4.5-6.0   5.1-7.3	
	31-39	' 	•	5.1-7.3	•
i	39-60	4.0-12.0	i	5.1-8.4	0-10
422500		!	1	l	ļ
433600: Annalake	l I 0−3	l I	   6.0-17.0	   4.5-6.0	I I 0
	3-6			4.5-6.0	•
I	6-17		5.0-13.0	4.5-6.0	0
				5.1-7.3   5.1-7.3	
		   4.0-12.0	0.0-14.0	5.1-7.3	
i		İ	İ	İ	İ
433671:			!		l
Arnheim		5.0-20.0   5.0-15.0	 	5.1-7.3   5.1-7.3	
i		5.0-15.0		5.1-7.3	
1		5.0-15.0		5.1-7.3	
	24-60	5.0-15.0		5.1-7.3	J 0
433676:		! 	! 	1 	! 
Redrim	0-1		80.0-120.0	3.6-5.5	0
	1-3	l	180.0-120.0		
	3-11   11-18			3.6-5.5   3.6-5.5	
		- 	0.0-5.0		0 
	10 00	i	i	•	 

Table 18.—Chemical Soil Properties—Continued

	<u> </u>		1	<u> </u>	<u> </u>
Map unit symbol and soil name	Depth	Cation- certain capacity		reaction	Calcium  carbon-   ate
	<u>In</u>	meq/100 g	meq/100 g	рН	Pct
433679:	] i	l	1	] i	 
Lapoin	0-1 1-4 1-4-7 1-7-19 1-19-34 1-34-39 1-39-80	     5.0-40.0   7.0-50.0   2.0-15.0	6.0-30.0	3.5-5.5 3.5-5.5 3.5-5.5 5.1-7.8 5.6-7.8 6.6-7.8	0-5 0-5
433686:	İ	İ	i	i	i
Zeba	0-2   2-5   5-13   13-21   21-33   33-80	       	1.0-10.0 1.0-10.0	4.5-6.5   4.5-6.5   4.5-6.5   4.5-6.5   4.5-6.5 	•
433729:	! 	i I	i		! 
Sultz	0-2 2-6 6-18 18-25 25-43 43-60	   1.0-6.0     1.0-6.0   1.0-3.0   1.0-15.0		5.1-6.5   3.6-7.3   3.6-6.5   5.1-6.5   5.1-7.3	0   0   0
433739:	 	! 	1	 	 
Moquah	5-19   19-48   48-55	9.1-13.4   7.1-15.1   7.1-15.1   10.2-15.5   0.0-5.6	     	4.5-7.8   4.5-7.8   4.5-7.8   4.5-7.8   4.5-7.8	0-5 0-5 0
452765:		i	i		İ
Abbaye	0-2   2-4   4-13   13-25   25-32   32-80	       	3.0-30.0 3.0-30.0	3.6-5.5   4.5-6.0   4.5-6.0   4.5-6.0   4.5-6.0	0   0
Lapoin	19-34		 		0   0-5   0-5
1383557:	l 1 0-2		 		l 
Au Gres	0-2   2-5   5-8   8-16   16-28   28-60	 	2.0-5.0   2.0-5.0   2.0-5.0	4.5-7.3   3.5-7.3   4.5-6.0   4.5-6.5   3.5-7.3   4.5-7.3	0   0   0

Table 18.—Chemical Soil Properties—Continued

Map unit symbol   and soil name	Depth	   Cation-   exchange   capacity		reaction	  Calcium  carbon-   ate
	In	   meq/100 g	meg/100 g	рН	l Pct
i	_	i	i i	<u>-</u>	<u> </u>
1383580:   Loxley	0-13 13-60	•	  50.0-100.0    50.0-120.0		   0   0
Beseman	0-36 36-60	   3.0-15.0	50.0-150.0   	3.5-4.4 3.5-7.3	•
Dawson		i	  80.0-120.0    150.0-230.0  	3.5-4.4	,   0   0
1383581: Rifle		    140.0-180.0  140.0-180.0		5.6-7.3 5.6-7.3	•
1383603: Cornucopia	3-10 10-32 32-45			4.5-6.5 5.1-7.3 5.6-7.8 7.4-9.0 7.4-8.4 6.1-8.4	0-5 2-20 2-20
1383658:		 			 
Deerton	0-1 1-9 9-10 10-25 25-39 39-80	   		3.5-6.0 3.5-6.0 3.5-6.0	0
Brownstone	0-2 2-12 12-15 15-23 23-33 33-80	   	4.0-10.0	3.6-5.5 3.5-6.5 3.5-6.5 3.5-6.5 3.5-6.5	0   0   0
1383660:		! 			! 
Deerton	0-1 1-9 9-10 10-25 25-39 39-80	       		3.5-6.0 3.5-6.0 3.5-6.0 	0   0   0
Brownstone	0-2 2-12 12-15 15-23 23-33 33-80	   	1.0-6.0     4.0-10.0     2.0-8.0	3.6-5.5 3.5-6.5 3.5-6.5 3.5-6.5 3.5-6.5	0   0   0
1383662:		İ	i i		I
Abbaye          	0-2 2-4 4-13 13-25 25-32 32-80	   	3.0-30.0     3.0-30.0     2.0-15.0	3.6-5.5 4.5-6.0 4.5-6.0 4.5-6.0 4.5-6.0	0   0   0

Table 18.—Chemical Soil Properties—Continued

Map unit symbol   and soil name     	Depth	Cation-   exchange   capacity 		reaction	Calcium  carbon-   ate 
	In	meq/100 g	meq/100 g	рН	Pct
I		ı ———	ı ı		ı —
1383665:	0.3	1 4 0 20 0		2 5 7 2	1
Allendale		4.0-20.0   1.0-5.0		3.5-7.3 4.5-7.3	
i		1.0-5.0		4.5-6.0	
i	13-26	1.0-5.0	i i	4.5-6.5	0
ļ.		1.0-5.0		4.5-7.3	
		8.0-25.0   8.0-25.0	 	6.1-8.4 6.1-8.4	
¦	34-60	6.0-25.0 	 	6.1-6.4	l   0-10
Wakeley	0-4		100.0-140.0	3.6-5.0	0
I		1.0-5.0		5.6-7.8	
!		1.0-5.0		5.6-7.8	
<u>'</u>	28-80	12.0-18.0 		7.4-8.4	12-26 
Kinross	0-6		100.0-140.0	3.6-5.0	0
ļ.				3.6-5.0	
!	10-12 12-24	•		3.6-6.0 3.6-6.0	
¦	24-42	 		4.5-6.5	
i	42-60	1.0-2.0	i i	4.5-6.5	•
I I		l	1 1		l
1383960:   Flink	0-2	l 		3 5-6 0	l I 0
	2-3	•	80.0-120.0		
i		•		3.5-6.0	•
I	6-9			3.5-6.0	0
!	9-26			3.5-6.0	
<u> </u>		0.0-3.0   0.0-3.0		5.1-7.3 5.1-7.3	
i		1 2.0-20.0		5.1-7.3	
i		2.0-20.0	i i	5.1-7.3	•
1444055		!	!!!		l
1444357:   Arnheim	0-5	I I 5.0-20.0		5.1-7.3	I I 0
		5.0-15.0	i i	5.1-7.3	
i	10-15	5.0-15.0	i i	5.1-7.3	0
ļ.		5.0-15.0		5.1-7.3	•
<u></u>	24-60	5.0-15.0		5.1-7.3	J 0
1444378:		İ	i i		' 
Wakefield	0-4	3.0-15.0		4.5-6.5	0
!	4-7	3.0-15.0		4.5-6.5	0
 		3.0-15.0  10.0-20.0	 	4.5-6.5 4.5-6.5	
•		110.0-20.0	' '	4.5-6.5	
i		110.0-20.0	i i	4.5-6.5	
!	49-64	5.0-15.0	! !	4.5-6.5	0
1444379:		 	1 I		l I
Wakefield	0-4	   3.0-15.0	i i	4.5-6.5	0
i	4-7	3.0-15.0	ı i	4.5-6.5	0
I		3.0-15.0	! !	4.5-6.5	
		10.0-20.0	1 1	4.5-6.5	0
i			1		
	24-36	10.0-20.0  10.0-20.0	i i I I	4.5-6.5	0

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth       	Cation- exchange capacity	•	reaction	Calcium carbon- ate
	In	meq/100 g	meq/100 g	рН	Pct
				ı — ı	
1444388:	l .	1	l I	l	
Allendale	0-3	4.0-20.0		3.5-7.3	
	3-10	1.0-5.0		4.5-7.3	
	•	1.0-5.0   1.0-5.0	 	4.5-6.0     4.5-6.5	
	•	1.0-5.0	 	4.5-6.5     4.5-7.3	
	•	8.0-25.0		6.1-8.4	
	34-60	8.0-25.0		6.1-8.4	
1444402:	 	 	 	 	
Tonkey	I 0-8	110.0-25.0		5.6-7.8	0
-	8-14	2.0-10.0		5.6-7.8	0
	14-28	2.0-10.0		5.6-7.8	0
	28-60	1.0-10.0		7.4-8.4	0-10
1444410:	! 	i		! 	
Tula	0-1		60.0-160.0	4.5-6.5	0
	1-5	l		5.1-6.5	
	5-8	2.0-8.0	ļ	5.1-6.5	
		2.0-10.0		5.1-6.5	
		2.0-10.0   1.0-8.0		5.1-6.5     5.1-6.0	
		1.0-8.0   4.0-12.0	 	5.1-6.0     5.6-6.5	
	62-80	4.0-10.0		5.6-6.5	
1444414:	  -	1	 	] 	 
Lupton	0-65	160.0-190.0		4.5-7.8	0
Cathro	l I 0-28	  150.0-230.0	 	   4.5-7.8	0
040	•	2.0-20.0		5.6-7.3	
	•	2.0-20.0		5.6-7.3	
Tawas	   0-31	  160.0-190.0	 	   4.5-7.8	0
	31-60	1.0-7.0		5.6-8.4	0
1444425:	 	 	 	] 	
Lerch	J 0-3	60.0-160.0		5.1-6.5	0
	J 3-7	32.0-54.0		5.1-6.5	0
		20.0-50.0		5.1-6.5	
		120.0-49.0		7.4-8.4	
	•	20.0-49.0   3.0-14.0	 	7.4-8.4     7.4-8.4	
	l I 0-5	   6.0-40.0		   5.1-7.3	
Herbster	•	6.0-40.0	 	5.1-7.3     5.1-6.5	
	•	4.0-35.0	·	5.1-6.5     5.1-7.3	
		4.0-35.0		6.1-7.8	
		120.0-30.0		6.1-7.8	
		120.0-30.0		7.4-9.0	
	55-80	1.0-20.0	l	7.4-8.4	
1444426:	I 	 	 	 	 
Portwing	0-4	6.0-40.0		4.5-7.3	0
		4.0-35.0		5.1-7.3	0
	•	7.0-50.0		6.1-7.8	
		7.0-50.0		7.4-9.0	
	51-80	1.0-15.0	I	6.1-8.4	0-10

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	   Depth   	   Cation-   exchange   capacity 		reaction	  Calcium  carbon-   ate 
	In In	<u>meq/100 g</u>	meq/100 g	рн	Pct
1444426: Herbster	     0-5	     6.0-40.0	 	     5.1-7.3	     0
	10-13	4.0-35.0   4.0-35.0   4.0-35.0	 	5.1-6.5 5.1-7.3 6.1-7.8	•
	28-33 33-55	20.0-30.0  20.0-30.0   1.0-20.0	   	6.1-7.8   7.4-9.0   7.4-8.4	0   0-10
1444427: Cornucopia	     0-3	     6.0-40.0	   	     4.5-6.5	     0
	•	4.0-35.0   7.0-50.0   7.0-50.0	 	5.1-7.3   5.6-7.8   7.4-9.0	0-5
	45-50   50-72	1.0-15.0	 	7.4-8.4	2-20
1444428: Cornucopia	     0-3	     6.0-40.0	   	     4.5-6.5	     0
	•	4.0-35.0   7.0-50.0   7.0-50.0	 	5.1-7.3   5.6-7.8   7.4-9.0	0-5
	45-50   50-72	1.0-15.0   1.0-15.0	 	7.4-8.4	2-20
1444431: Croswell	     0-1	   	•	     3.5-6.5	     0
	1-7   7-16   16-39   39-60	   1.0-7.0   0.0-6.0   0.0-4.0	1.0-9.0   	3.5-6.5   4.5-7.3   4.5-7.3   5.1-8.4	0   0   0   0-10
1444432: Gogebic	     0-1	 	      80.0-180.0	       3.6-5.5	l I
_	1-5   5-7   7-17	i I	8.0-14.0   5.0-10.0	3.6-6.0 3.6-6.0 3.6-6.0	,   0   0
	17-26 26-36	i I	5.0-10.0   4.0-12.0	3.6-6.0 3.6-6.0	,   0   0
	36-53   53-71   71-80	i	6.0-19.0	3.6-6.0   3.6-6.0   4.5-6.5	0
1444435: Iosco	     0-7	     4.0-10.0	   	     5.1-7.3	     0
	9-11	2.0-10.0   2.0-10.0   2.0-10.0	•	5.1-7.3   5.1-6.0   5.1-6.5	0
	28-34 34-40	2.0-10.0   4.0-10.0   8.0-20.0	   	5.1-6.5   6.1-7.8   6.6-8.4	0   3-6
1444457: Redrim	0-1	•	   80.0-120.0		•
	1-3   3-11   11-18   18-80	•	•	3.6-5.5   3.6-5.5   3.6-5.5 	0

Table 18.—Chemical Soil Properties—Continued

0-2 2-5 5-13 13-21 21-33 33-80 0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	meq/100 g		4.5-6.0     4.5-6.0     4.5-6.0     4.5-6.0   	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2-5 5-13 13-21 21-33 33-80 0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7		1.0-10.0   1.0-10.0   1.0-10.0   1.0-10.0   1.0-10.0   	4.5-6.5   4.5-6.5   4.5-6.5   4.5-6.5     3.6-5.5   4.5-6.0   4.5-6.0   4.5-6.0   4.5-6.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
2-5 5-13 13-21 21-33 33-80 0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	                 	1.0-10.0   1.0-10.0   1.0-10.0   1.0-10.0   1.0-10.0   	4.5-6.5   4.5-6.5   4.5-6.5   4.5-6.5     3.6-5.5   4.5-6.0   4.5-6.0   4.5-6.0   4.5-6.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
5-13 13-21 21-33 33-80 0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	               	1.0-10.0   1.0-10.0   1.0-10.0   	4.5-6.5   4.5-6.5   4.5-6.5     3.6-5.5   4.5-6.0   4.5-6.0   4.5-6.0   4.5-6.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
13-21 21-33 33-80 0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	             	1.0-10.0   1.0-10.0         80.0-120.0   3.0-30.0   2.0-15.0   1.0-2.0 	4.5-6.5   4.5-6.5     3.6-5.5   4.5-6.0   4.5-6.0   4.5-6.0   4.5-6.0	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	             	1.0-10.0                             	4.5-6.5       3.6-5.5   4.5-6.0   4.5-6.0   4.5-6.0   4.5-6.0	0 0 0
0-2 2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	           		4.5-6.0     4.5-6.0     4.5-6.0     4.5-6.0   	0 0
2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	           	3.0-30.0   3.0-30.0   2.0-15.0   1.0-2.0 	4.5-6.0     4.5-6.0     4.5-6.0     4.5-6.0   	0 0
2-4 4-13 13-25 25-32 32-80 0-1 1-4 4-7	         	3.0-30.0   3.0-30.0   2.0-15.0   1.0-2.0 	4.5-6.0     4.5-6.0     4.5-6.0     4.5-6.0   	0 0
4-13 13-25 25-32 32-80 0-1 1-4 4-7	         	3.0-30.0   2.0-15.0   1.0-2.0 	4.5-6.0     4.5-6.0     4.5-6.0   	0
13-25 25-32 32-80 0-1 1-4 4-7	     	2.0-15.0   1.0-2.0 	4.5-6.0   4.5-6.0 	0
32-80 0-1 1-4 4-7	       	i i	i	0 
0-1 1-4 4-7	     	i	 	
1-4 4-7	   	80.0-120.0		
4-7			J.5-5.5	0
7-19	   5.0-40.0	5.0-25.0	3.5-5.5     5.1-7.8	-
19-34	7.0-50.0	i i	5.6-7.8	0-5
	•			0-5
39-60	, I	I 0.0-0.0	 	
0.0	l :			
-	 	•	•	-
4-13		•	•	
13-25		•	•	
	 	1.0-2.0	4.5-6.0   	0 
	İ	i i	i i	ĺ
0-2		•	•	'
_	 	•	•	-
13-21		1.0-10.0	4.5-6.5	_
		•	•	0
33-60	i I	 		
	l	I		!
	 	•	•	
	' 			
	•			
0-1	   2 0-10 0	I !		l I 0
1-7	•	•	•	
7-16	•	•		
	İ	i i	İ	Ì
-		•	•	
12-32	2.0-4.0	i	5.6-7.3	0
	7-19 19-34 34-39 39-80  0-2 2-4 4-13 13-25 25-32 32-80  0-2 2-5 5-13 13-21 21-33 33-80  0-3 3-4 4-23 23-32 32-40 40-48 48-60  0-1 1-7 7-16 16-39 39-60  0-4 4-5 5-12 12-32 32-45 45-62 62-80	4-7   7-19   5.0-40.0 19-34   7.0-50.0 34-39   2.0-15.0 39-80	1-4	1-4

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation-   exchange   capacity 	•	reaction	Calcium  carbon-   ate 
	In	meq/100 g	<del></del>	pН	Pct
1	_	1	1	ı <del>-</del>	
1444478:		ļ.			
Cublake	0-3   3-4	 	•	3.5-6.0	0
	3-4 4-23	•	0.0-10.0   0.0-4.0	3.5-6.0     3.5-6.5	) 0 I 0
	23-32	' 	•	3.5-6.5	
i	32-40		0.0-5.0	3.5-7.3	0
1	40-48		0.0-5.0	3.1-7.3	
	48-60	2.0-20.0		5.1-7.3	0
Croswell	   0-1	I I 2.0-10.0	l I	   3.5-6.5	l I 0
CIOSWEII	1-7			3.5-6.5	
i	7-16			4.5-7.3	0
I	16-39		•	4.5-7.3	
	39-60	1.0-2.0		5.1-8.4	0
Ashwabay	0-4	I I 5.0-10.0	l I	   5.1-6.5	l I 0
nsiiwabay	4-5	1 2.0-4.0	•	4.5-6.5	
i	5-12	i	2.0-4.0	4.5-6.0	0
i	12-32	2.0-4.0		5.6-7.3	0
I		2.0-3.0		6.1-7.3	
		118.0-31.0		6.1-7.3	
	62-80	1.0-31.0		6.1-7.3	0
1444479:		i I	İ		) 
Morganlake	0-4		2.0-10.0	3.5-6.5	0
	4-8	2.0-15.0		3.5-6.0	0
1	8-26	0.0-10.0		3.5-6.0	
		0.0-10.0	!	3.5-6.0	
		4.0-30.0   4.0-30.0		5.6-8.4     5.6-8.4	
	40-60	4.0-30.0 	 	5.0-0.4	l 0-30
1444480:		i	i	i	İ
Morganlake	0-4		2.0-10.0	3.5-6.5	0
I		2.0-15.0		3.5-6.0	
	8-26	0.0-10.0		3.5-6.0	
		0.0-10.0   4.0-30.0		3.5-6.0     5.6-8.4	
		1 4.0-30.0		5.6-8.4	
i		İ	i	I	
1444481:	l	I	1		l .
Kellogg	0-2		180.0-120.0		0
	2-6	 		4.5-6.0	0
		10.0-25.0		4.5-6.5     6.1-7.8	
		110.0-25.0	•	6.1-7.8	
		110.0-25.0		6.1-8.5	
		<u> </u>	I		]
Allendale		4.0-20.0		3.5-7.3	
		1.0-5.0		4.5-7.3	
		1.0-5.0   1.0-5.0		4.5-6.0     4.5-6.5	
		1.0-5.0		4.5-7.3	
		8.0-25.0		6.1-8.4	0-10

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	   Depth   	Cation- cachange capacity	exchange	reaction	  Calcium  carbon-   ate
	l In	   meq/100 g	meq/100 g		l Pct
	<u> </u>		<u></u>	<u> </u>	1
1444481:	l .	I	I I	l	Ι
Ashwabay	0-4   4-5	5.0-10.0   2.0-4.0	•	5.1-6.5   4.5-6.5	l 0 I 0
			•	4.5-6.0	•
		2.0-4.0	i	5.6-7.3	•
		2.0-3.0  18.0-31.0	•	6.1-7.3   6.1-7.3	•
	43-62	1.0-31.0		6.1-7.3	1 0
	İ	İ	İ		İ
1444482: Kellogg	l I 0-2		  80.0-120.0	   3.6-5.5	l I 0
Kellogg	l 2-6		•	4.5-6.0	1 0
	6-26	i	1.0-5.0	4.5-6.5	0
		10.0-25.0	•	6.1-7.8	•
		10.0-25.0  10.0-25.0	 	6.1-7.8   6.1-8.5	0-5   0-5
	İ	İ	i i	ĺ	İ
Allendale		4.0-20.0	•	3.5-7.3	•
	3-10   10-13	1.0-5.0   1.0-5.0	•	4.5-7.3   4.5-6.0	•
	•	1.0-5.0	•	4.5-6.5	•
	26-28	1.0-5.0	•	4.5-7.3	•
	28-34   34-60	8.0-25.0   8.0-25.0	 	6.1-8.4   6.1-8.4	•
		1	i i		0 =0
Ashwabay		5.0-10.0	•	5.1-6.5	•
	4-5   5-12	2.0-4.0	•	4.5-6.5   4.5-6.0	•
	•	2.0-4.0	•	5.6-7.3	•
		2.0-3.0	•	6.1-7.3	•
	45-62   62-80	18.0-31.0   1.0-31.0	 	6.1-7.3   6.1-7.3	l 0 I 0
	1	1	i	0.1 7.5	İ
1444486:	l 0 5	1	!		l
Sedgwick	0-5   5-8	6.0-20.0   2.0-15.0	 	4.5-7.3   4.5-6.0	0   0
		4.0-20.0	•	4.5-6.0	•
	•	7.0-70.0		5.1-7.3	•
	19-53   53-80	7.0-70.0   7.0-70.0	 	7.4-9.0 7.4-9.0	0-10   2-35
	55 55	1	i		2 33
Munuscong		5.0-15.0	•	6.1-7.8	•
		2.0-10.0  10.0-30.0	 	6.1-7.8   7.4-8.4	
		1	i i		
1444487:	l		!		l
Superior	0-3   3-6	3.0-15.0   3.0-15.0	 	5.1-7.3   5.1-7.3	
	6-14			4.5-6.0	
		8.0-65.0		5.1-6.0	
	19-26   26-60	8.0-65.0   8.0-65.0	 	5.1-7.3   7.4-8.4	
	İ	İ	i	ĺ	ĺ
Sedgwick		6.0-20.0	•	4.5-7.3	
		2.0-15.0   4.0-20.0		4.5-6.0   4.5-6.0	•
		7.0-70.0	•	5.1-7.3	
		7.0-70.0		7.4-9.0	
	53-80 	7.0-70.0 		7.4-9.0 	2-35 
		•		,	

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	   Depth	   Cation-   exchange	   Effective   cation-	   Soil   reaction	  Calcium  carbon=
and soll name	! 	capacity	exchange capacity	•	ate
	I In	meq/100 g	meq/100 g	<u>рн</u>	Pct
1444488:	l I	1	1	l I	 
Superior	,   0-3	3.0-15.0	i	5.1-7.3	0
	3-6	3.0-15.0		5.1-7.3	•
	6-14   14-19	   8.0-65.0		4.5-6.0   5.1-6.0	•
	19-26	8.0-65.0	'	5.1-7.3	•
	26-60	8.0-65.0	i	7.4-8.4	0-25
Sedgwick	l I 0-5	   6.0-20.0		   4.5-7.3	I I 0
beagwick	•	2.0-15.0	•	4.5-6.0	
	8-16	4.0-20.0		4.5-6.0	
	16-19	7.0-70.0	•	5.1-7.3	•
	19-53   53-80	7.0-70.0   7.0-70.0	 	7.4-9.0   7.4-9.0	•
	i	İ	i	i	İ
1444489: Sultz	l l 0-2	1	  80.0-120.0	   5.1-6.5	I I 0
Suitz	0-2   2-6	1.0-6.0	•	5.1-6.5   3.6-7.3	•
	6-18	i	•	3.6-6.5	•
	18-25	1.0-6.0	•	5.1-6.5	•
	25-43   43-60	1.0-3.0   1.0-15.0	 	5.1-6.5   5.1-7.3	•
		1	i	İ	İ
Ashwabay	0-4	5.0-10.0		5.1-6.5	
	4-5   5-12	2.0-4.0 		4.5-6.5   4.5-6.0	•
	12-32	2.0-4.0	•	5.6-7.3	
	32-45	2.0-3.0		6.1-7.3	0
		18.0-31.0		6.1-7.3	•
	62-80 	1.0-31.0 		6.1-7.3 	0 
Rubicon	0-1	i		4.5-6.0	
	1-6			4.5-6.0	
	6-18   18-36		1.0-4.0   1.0-4.0	4.5-6.0   4.5-6.0	
	36-60	1.0-2.0		4.5-7.3	
1444400.		!	1		ļ
1444492: Manistee	I I 0-3	   5.0-15.0		I   4.5-7.3	I I 0
	3-11	1.0-5.0	i	4.5-7.3	
	11-28	1.0-5.0		5.1-6.5	•
	28-30   30-38	1.0-5.0  10.0-25.0		5.1-7.3   5.1-7.3	0   0
		110.0-25.0		6.6-8.4	
11	l	!			l
Kellogg	0-2   2-6	 		3.6-5.5   4.5-6.0	
	6-26	i		4.5-6.5	
		10.0-25.0		6.1-7.8	0-5
		10.0-25.0  10.0-25.0		6.1-7.8	
	40-80 	110.0-23.0		6.1-8.5 	0-5 
Ashwabay		5.0-10.0		5.1-6.5	
		2.0-4.0		4.5-6.5	
	5-12   12-32			4.5-6.0   5.6-7.3	
		2.0-3.0		6.1-7.3	
		18.0-31.0		6.1-7.3	
		1.0-31.0		6.1-7.3	
	l	I	I	ı	I

Table 18.—Chemical Soil Properties—Continued

	   Depth   	exchange	   Effective   cation-   exchange   capacity	reaction	  Calcium  carbon-   ate 
	<u>In</u>	meq/100 g	meq/100 g	рн	Pct
1444506:	     0-2	     3.0-9.0	 	     4.5-6.5	     0
Keweenaw		3.0-9.0   3.0-12.0	•	4.5-6.5   4.5-6.5	•
	•	1.0-9.0	•	4.5-6.5	•
		0.0-15.0	•	4.5-6.5	•
		0.0-15.0	•	4.5-6.5	•
	_	0.0-15.0   0.0-15.0	•	4.5-6.5   4.5-6.5	•
		0.0-15.0	•	5.1-6.5	•
Rubicon	0-1	•	•	   4.5-6.0	•
	1-6	•	•	4.5-6.0	•
	6-18   18-36	•	•	4.5-6.0   4.5-6.0	•
		0.0-4.0	•	4.5-7.3	•
1444507:			! 	     4 5 6 5	
Keweenaw		3.0-9.0   3.0-12.0	•	4.5-6.5   4.5-6.5	•
	•	1.0-9.0	•	4.5-6.5	•
		0.0-15.0	•	4.5-6.5	•
		0.0-15.0	•	4.5-6.5	•
	_	0.0-15.0   0.0-15.0	•	4.5-6.5   4.5-6.5	•
		0.0-15.0	•	5.1-6.5	•
Rubicon	0-1	•	•	4.5-6.0	•
	1-6   6-18	•	•	4.5-6.0   4.5-6.0	•
	0-16   18-36	•	•	4.5-6.0 4.5-6.0	•
		0.0-4.0	•	4.5-7.3	•
1444585:		    -		! !	
Meehan, beaches	0-4   4-29	 	•	3.5-7.3   3.5-6.5	•
	29-60	 	•	3.5-7.3	
1444586:		 	 	 	 
Wurtsmith, beaches		•	80.0-120.0		•
	1-4   4-24	•	•	3.5-6.0   3.5-6.0	•
	24-48	' 	•	3.5-7.3	•
	48-80 	 	1.0-2.0 	3.5-7.3 	I 0 I
1444587: Grayling, beaches	   0-3	 	   2.0-14.0	   3.5-5.5	I I 0
Graying, beaches	3-15	' 	•	3.5-5.5	
i	15-23			3.5-5.5	
	23-60 	1.0-2.0 	 	3.5-8.4 	0-15 
1529830: Meehan, beaches	   0-4	:   	   2.0-15.0	   3.5-7.3	I I 0
recitati, Deacties	0-4   4-29	· ·	•	3.5-7.3	
	29-60	•	•	3.5-7.3	
1700372:		 	! 		! 
Loxley			50.0-100.0  50.0-120.0		
	13-60 	ı I		3.5-4.4 	0 
Beseman	0-36		50.0-150.0		
	36-60	3.0-15.0		3.5-7.3	I 0
	l	I	I	I	I

Table 18.—Chemical Soil Properties—Continued

Map unit symbol and soil name	Depth	Cation- exchange capacity	exchange	reaction	  Calcium  carbon-   ate
	l In	meg/100 g	capacity     meg/100 g		l Pct
1700372: Dawson		 		3.5-4.4	 
	40-60	1.0-2.0	i i	3.5-6.5	
1700373: Rifle		 			 
1700374: Allendale	10-13 13-26 26-28	4.0-20.0   1.0-5.0   1.0-5.0   1.0-5.0   1.0-5.0   1.0-5.0   8.0-25.0	i i	4.5-7.3 4.5-6.0 4.5-6.5	0 0 0 0 0 0-10
Wakeley	0-4   4-23   23-28   28-80	   1.0-5.0   1.0-5.0  12.0-18.0	  100.0-140.0      	5.6-7.8 5.6-7.8	
Kinross	0-6   6-10   10-12   12-24   24-42   42-60	         1.0-2.0	1.0-10.0     1.0-10.0	3.6-5.0 3.6-5.0 3.6-6.0 3.6-6.0 4.5-6.5 4.5-6.5	0   0   0
1702605: Menominee	0-4 4-7 7-23 23-39 39-59 59-80		2.0-10.0     2.0-10.0   	3.5-6.5 3.5-6.0	0-10 0-30
1702606:	]	i I			! 
	0-1 1-9 9-10 10-25 25-39 39-80	i I		3.5-6.0 3.5-6.0	
	0-2 2-12 12-15 15-23 23-33 33-80	 	4.0-10.0     2.0-8.0	3.6-5.5 3.5-6.5 3.5-6.5 3.5-6.5 3.5-6.5	0   0   0
	0-1 1-9 9-10 10-25 25-39 39-80	 	1.0-5.0	3.5-6.0 3.5-6.0 3.5-6.0 	0   0

Table 18.—Chemical Soil Properties—Continued

Map unit symbol	   Depth	I   Cation-	   Effective	   Soil	  Calcium
and soil name	Depen	exchange		reaction	
0		capacity	•		l ate
i	i		capacity	i i	i
	In	meg/100 g	meg/100 g	рн	l Pct
i		1	1	<u> </u>	<u> </u>
1702607:	! 	i i	i	<u> </u>	I
Brownstone	0-2		180.0-120.0	I 3.6-5.5	i 0
	2-12		1 1.0-6.0	3.5-6.5	i 0
i	12-15		1 4.0-10.0	3.5-6.5	i 0
i	15-23		1 2.0-8.0	3.5-6.5	i 0
i	23-33		0.0-5.0	3.5-6.5	I 0
i	33-80				I 0
		İ	i	İ	İ
1702608:	]	l	İ	l	İ
Abbaye	0-2		80.0-120.0	3.6-5.5	0
-	2-4		3.0-30.0	4.5-6.0	0
	4-13		3.0-30.0	4.5-6.0	J 0
I	13-25		2.0-15.0	4.5-6.0	J 0
İ	25-32		1.0-2.0	4.5-6.0	J 0
ĺ	32-80				
		l	1	l	l
1711685:		l	1	l	l
Cublake	0-3		1.0-10.0	3.5-6.0	J 0
	3-4		0.0-10.0	3.5-6.0	J 0
	4-23		0.0-4.0	3.5-6.5	J 0
	23-32		0.0-5.0	3.5-6.5	J 0
	32-40		0.0-5.0	3.5-7.3	J 0
I	40-48		0.0-5.0	3.1-7.3	1 0
I	48-60	2.0-20.0		5.1-7.3	0
l	l	l	1		1
Keweenaw	0-2	3.0-9.0		4.5-6.5	1 0
	2-4	3.0-12.0		4.5-6.5	0
	4-16	1.0-9.0			0
	16-20	0.0-15.0		4.5-6.5	0
	20-27	0.0-15.0		4.5-6.5	0
	27-43	0.0-15.0		4.5-6.5	0
	43-75	0.0-15.0			0
	75-80	0.0-15.0		5.1-6.5	. 0
	l	<u> </u>	<u> </u>	<u> </u>	<u> </u>

## Table 19.-Water Features

(See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. If a soil is ponded, the water table limits are listed twice; the ponding depth is given as 0.0 to a certain depth and the depths of the below-the-surface water table are given on the next line. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

	1	1	Water	table	1	Ponding	r I	Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1 1		1
	group	1	I	I	depth		1		1
		1	Ft	Ft	Ft		<u> </u>		1
	i	Ī	i —		i - i		i i		i
33292:	i	i	i	I	i i		i i		i
Lerch	-i р	i	i	İ	i i		i i		i
	i	January	I 0.0	2.0	10.0-1.01	Long	Frequent		None
	i	i -	3.5	>6.0	i i	,	i i		i
	i	February	0.0	2.0	10.0-1.01	Long	Frequent		None
	i	i	3.5	·   >6.0	i i	,	i i		i
	i	March	0.0	2.0	0.0-1.0	Long	Frequent		None
	i	İ	3.5	>6.0	i i	-	i i		i
	i	April	0.0	2.5	0.0-1.0	Long	Frequent		None
	1	1	3.5	>6.0	1 1	_	1 -		1
	1	May	0.0	2.0	0.0-1.0	Long	Frequent		None
	1	1	3.5	>6.0	1 1		1 1		1
	1	June	0.0	1.5	0.0-1.0	Long	Frequent		None
	1	1	3.5	>6.0	1 1		1		1
	1	July	0.5	1.0	0.0-1.0	Brief	Occasional		None
	1	1	4.0	>6.0	1 1		1		1
	1	August	4.0	>6.0	0.0-1.0	Brief	Occasional		None
	1	September	4.0	>6.0	0.0-1.0	Brief	Occasional		None
	1	October	0.0	1.5	0.0-1.0	Brief	Frequent		None
	1	1	4.0	>6.0	1 1		1		1
	1	November	0.0	2.5	0.0-1.0	Long	Frequent		None
	1	1	3.5	>6.0	1 1		1		1
	1	December	0.0	2.5	0.0-1.0	Long	Frequent		None
	1	1	3.5	>6.0	1 1		1		1
	1	1	I	I	1 1		1		1

Table 19.-Water Features-Continued

	T	ı	Water	table	ı	Ponding	ı	Floodi	.ng
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		l I		1
	group	1	l	l	depth		l I		1
	T	ı	Ft	Ft	Ft		l l		I
	1	I	. —				1		1
433292:	1	I	I	I	1 1		l I		1
Herbster	-  D	I	I	I	1 1		l I		1
	1	January	0.0	1.0	1 1		None		None
	1	1	3.5	>6.0	1 1		l I		1
	1	February	0.0	1.0			None		None
	1	1	3.5	>6.0	1 1		l I		1
	1	March	0.0	1.0			None		None
	1	1	3.5	>6.0	1 1		I I		1
	1	April	0.0	2.0			None		None
	1	1	3.5	>6.0	1 1		l l		1
	1	May	0.0	1.5			None		None
	1	1	3.5	>6.0	1 1		1		1
	1	June	4.0	>6.0			None		None
	i	July	5.0	>6.0	i i		None		None
	i	August	I 5.0	>6.0	i i		None I		None
	i	September	5.0	>6.0	i i		None		None
	i	October	0.0	1.0	i i		None I		None
	i	i	1 4.0	I >6.0	i i		i i		i
	i	November	0.0	1.5	i i		None		None
	i	1	3.5	>6.0	i i		i i		1
	i	December	0.0	0.5	i i		None I		None
	i	I	3.5	0.5   >6.0	; ;		1 10110 1		1
	i	i	1	1	; ;		i i		i
433296:	i	i	i	i	; ;		i i		i
Cublake	-  A	i	i	i	; ;		i i		i
Cubiane	i	  January	3.0	1 4.0	i i		None		None
	;	February	3.0	1 4.0	i		None		None
	;	March	1 2.5	1 4.0	i i		None		None
	-	April	1 2.0	1 4.5	i i		None		None
	-	May	1 2.0	1 4.5	i i		None		None
	-	June	1 3.0	1 4.0			None		None
	-	October	1 3.0 I 3.0	1 4.5			None		None
	:		2.5	1 5.0					•
	:	November	1 3.0	1 4.5			None		None
	:	December	1 3.0	1 4.5			None		None
C11	! .	!	!	!	! !				1
Croswell	-  A	I	1 4 0	1	! !				1
	!	January	4.0	>6.0			None		None
	!	February	5.0	>6.0	! !		None		None
	!	March	3.5	>6.0			None		None
	!	April	2.0	>6.0			None		None
	!	May	2.5	>6.0	! !		None		None
	1	June	4.0	>6.0			None		None
	1	July	4.5	>6.0			None		None
	1	August	5.0	>6.0			None		None
	1	September	4.0	>6.0			None		None
	1	October	3.5	>6.0			None		None
	1	November	3.0	>6.0			None		None
	1	December	3.5	>6.0			None		None

Table 19.-Water Features-Continued

	1	1	<u>Wate</u> r	table	1	Ponding	I_	Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	I	limit	limit	water		l l		1
	group	I	I	I	depth		l l		1
	ī		Ft	Ft	Ft		I I		1
	i	i	; —	· —	i - i	· 	I İ		i
433296:	i	i	i	i	i i		i i		i
Ashwabay	I B	i	i i	i	i i		i i		i
	i -	  January	3.5	I 4.5	i i		None		None
	i	February	3.5	1 4.5	i i		l None l		None
	i	March	3.0	1 4.5	i i		None		None
	i	April	1 2.5	1 4.5	i i		None		None
	i	May	1 2.5	1 4.5	i i		None		None
	i	June	3.5	1 4.5	i i		None		None
	i	October	3.0	1 4.0	i i		None		None
	i	November	3.0	1 4.5	i i		l None l		None
	i	December	3.0	1 4.5	i i		None		None
	i	I	1	1	;		1 1		1
433299:	i	i	i i	i	;	, 	; ;		i
Cublake	   A	i	i I	i	;		; ;		i
Cabiane		January	3.0	1 4.0	i i		l None I		None
	i	February	3.0	1 4.0	i i		None		None
	i	March	2.5	1 4.0	i i		None		None
	i	April	1 2.0	1 4.5	i i		None		None
	i	May	1 2.0	1 4.5	' '		None		None
	i	June	1 3.0	1 4.0	' '		None		None
	i	October	3.0	1 4.5	i		None		None
	i	November	1 2.5	1 5.0	i		None		None
	i	December	1 3.0	1 4.5	i i		None		None
	i	I	1	1	;		1 1		1
Croswell	' A	i	i	i	;		; ;		i
0100#011		  January	1 4.0	'   >6.0	i i		l None I		None
	i	February	5.0	>6.0	i i		None		None
	i	March	3.5	>6.0	i i		None		None
	i	April	1 2.0	>6.0   >6.0	i i		None		None
	i	May	2.5	>6.0	i i		None		None
	i	June	4.0	>6.0	i i		None		None
	i	July	1 4.5	>6.0	i i		None		None
	i	August	5.0	>6.0	i i		None		None
	i	September	1 4.0	>6.0	i i		None		None
	i	October	3.5	>6.0   >6.0	i i		None		None
	i	November	3.0	>6.0	i i		None		None
	i	December	3.5	>6.0   >6.0	i i		None		None
	i	December	1 3.3	1 /0.0	;		I NOME I		I None
Ashwabay	·IB	<u> </u>	<u> </u>	<u> </u>	;		' '		i
nsiiwabay		  January	3.5	1 4.5	' '		None		None
	i	February	3.5	1 4.5			None		None
	i	March	3.0	1 4.5			None		None
	i	April	1 2.0	1 4.5			None		None
		May	1 2.5	1 4.5	i		None		None
	1	May  June	1 2.5 1 3.5	1 4.5 1 4.5		 	None		None
	1	October	3.5 3.0	1 4.0	l		None		None
	1	November	3.0 3.0	1 4.0 1 4.5	===	 	None     None		None
	1	•	•	•		<del></del>			
	I	December	3.0	4.5			None		None

Table 19.-Water Features-Continued

		1	Water	table		Ponding		Floodi	ng
National symbol	Hydro-	Month	Upper			Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		l I		1
	group	1	1	<u> </u>	depth		I		1
		I	Ft	Ft	Ft		1		1
	1	I	1		1		1		1
433300:	1	1	I	l	1		l I		1
Kellogg	l C	1	1	l	1		l I		1
		January	2.0	3.0			None		None
		February	2.0	3.0			None		None
	1	March	2.0	3.0			None		None
		April	1.5	3.0			None		None
		May	2.0	3.0			None		None
	I	June	2.0	] 3.0			None		None
	I	October	2.0	2.5			None		None
	1	November	2.0	] 3.0			None		None
	1	December	2.0	3.0			None		None
Allendale	l ·I C	1	1	!	!				!
Allendare	•	  January	1 1.0	ı I 2.5	l 	 	None		   None
		February	1 1.0	2.5	·		None		None
		March	1 1.0	1 3.0	i		None		None
	•	April	0.5	3.0	· 		None		None
		May	0.5	1 3.0			None		None
		June	1 1.0	1 2.5			None		None
		July	1 1.5	1 2.5	! !		None		None
		August	1 2.0	1 2.5	! !		None		None
		September	1 2.0	1 2.5	· 		None		None
		October	1 1.0	1 2.5			None		None
	•	November	1 1.0	1 2.5	! !		None		None
		December	1.5	2.5			None		None
	i		1 1.5	2.5 	i				None
Ashwabay	B	i	i	İ	i	i	i		i
<u>-</u>	1	January	3.5	4.5			None		None
		February	3.5	4.5	i		None		None
	İ	March	3.0	4.5	i		None		None
	İ	April	2.5	4.5	i		None		None
	İ	May	2.5	4.5	i		None		None
	İ	June	3.5	4.5	i		None		None
	İ	October	3.0	4.0	i		None		None
	i	November	3.0	4.5	i		None		None
	i	December	3.0	4.5	i		None		None
	1	I	I	I	1		I		1
433301:	1	1	I	I	1		1		1
Kellogg	l C	1	1	l	1		l I		1
		January	2.0	3.0			None		None
		February	2.0	3.0			None		None
		March	2.0	3.0			None		None
		April	1.5	3.0	I		None		None
		May	2.0	3.0	I		None		None
	1	June	2.0	3.0			None		None
	1	October	2.0	2.5			None		None
	1	November	2.0	3.0	I		None		None
	I	December	2.0	3.0			None		None

Table 19.-Water Features-Continued

National symbol			Water table		Ponding r  Surface  Duration   Frequence			Flooding		
	Hydro-		Upper	Lower	Surface	Duration	Frequency	Duration	Frequency	
and soil name	logic	I	limit	limit	water		l I		1	
	group	I			depth		l I		1	
	ī	I	Ft	Ft	Ft		l l		1	
	1	I	. — ,				l l		1	
433301:	İ	İ	i i		i i		i i		i	
Allendale	i c	İ	i i		i i		i i		i	
	İ	January	1.0	2.5	i i		None		None	
	İ	February	1.0	2.5	i i		None		None	
	İ	March	1.0	3.0	i i		None		None	
	I	April	0.5	3.0			None		None	
	I	May	0.5	3.0			None		None	
	I	June	1.0	2.5			None		None	
	I	July	1.5	2.5	i i		None		None	
	I	August	2.0	2.5	i i		None		None	
	I	September	2.0	2.5			None		None	
	I	October	1.0	2.5			None		None	
	I	November	1.0	2.5			None		None	
	I	December	1.5	2.5			None		None	
	I	I			1 1		l l		1	
Ashwabay	B	I			1 1		l l		1	
_	I	January	3.5	4.5			None		None	
	I	February	3.5	4.5			None		None	
	İ	March	3.0	4.5	i i		None		None	
	I	April	2.5	4.5			None		None	
	I	May	2.5	4.5			None		None	
	I	June	3.5	4.5			None		None	
	I	October	3.0	4.0			None		None	
	I	November	3.0	4.5			None		None	
	1	December	3.0	4.5			None		None	
	1	I			1 1		l I		1	
133304:	1	I			1 1		l l		1	
Sedgwick	l D	I			1 1		l l		1	
	1	January	1.0	2.5			None		None	
	1	February	1.0	2.5			None		None	
	1	March	0.5	2.5			None		None	
	I	April	0.5	2.5			None		None	
	I	May	0.5	2.5			None		None	
	I	June	0.5	1.5			None		None	
	I	October	1.0	1.5	i i		None		None	
	I	November	0.5	2.5	i i		None		None	
	1	December	0.5	2.5	i i		None		None	

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Floodi	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1		1
	group	1	<u> </u>	1	depth		1 1		1
	1	1	Ft	Ft	<u>Ft</u>		1		1
	1	I	Ι —	Ι —	1 - 1		1		1
433304:	1	1	l	I	1 1		1		1
Munuscong	-  B/D	1	I	I	1 1		1		1
	I	January	0.0	3.0			None		None
	1	February	0.0	3.0			None		None
	1	March	0.0	3.0	1 1		None		None
	I	April	0.0	3.0	10.5-0.5	_	Frequent		None
	I	May	0.0	3.0	10.5-0.5	_	Frequent		None
	I	June	0.5	3.0			None		None
	1	July	1.0	3.0			None		None
	1	August	1.5	2.5			None		None
	1	September	1.5	2.0			None		None
	1	October	0.5	2.0			None		None
	1	November	0.0	3.0	10.5-0.5	Brief	Occasional		None
	1	December	0.0	3.0			None		None
	1	1	I	I	1 1		1		1
433305:	1	1	I	I	1 1		1		1
Superior	-I C	1	I	I	1 1		1		1
	1	April	0.5	2.0			None		None
	1	May	1.0	2.0			None		None
	1	October	1.5	2.0			None		None
	1	November	1.0	2.0			None		None
	1	December	1.0	1.5			None		None
	1	1	I	I	1 1		1		1
Sedgwick	-  D	1	I	I	1 1		1		1
	1	January	1.0	2.5			None		None
	1	February	1.0	2.5			None		None
	1	March	0.5	2.5			None		None
	1	April	0.5	2.5			None		None
	1	May	0.5	2.5			None		None
	1	June	0.5	1.5			None		None
	1	October	1.0	1.5			None		None
	1	November	0.5	2.5			None		None
	1	December	0.5	2.5			None		None
	1	1	l	I	1 1		1		1
433309:	1	1	I	I	1 1		1		1
Superior	-I C	1	I	I	1 1		1		1
	1	April	0.5	2.0			None		None
	1	May	1.0	2.0			None		None
	1	October	1.5	2.0			None		None
	1	November	1.0	2.0			None		None
	1	December	1.0	1.5			None		None
	1	I	I	I	1 1		1		1

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1		1
	group	1	1	l	depth		1		1
	I	1	Ft	Ft	Ft		1		1
	1	1	_				1		1
433309:	1	I	1	l	1 1		1		1
Sedgwick	-   D	1	1	l	1 1		I I		1
	1	January	1.0	2.5			None		None
	1	February	1.0	2.5			None		None
	1	March	0.5	2.5			None		None
	1	April	0.5	2.5			None		None
	1	May	0.5	2.5			None		None
	1	June	0.5	1.5			None		None
	1	October	1.0	2.5			None		None
	1	November	0.5	2.5			None		None
	1	December	0.5	2.5			None		None
	1	1	1	l	1 1		1		1
433310:	1	1	1	l	1 1		1		1
Sultz	-  A	1	1	l	1 1		1		1
	1	Jan-Dec					None		None
	1	1	1	l	1 1		1		1
Ashwabay	-  B	1	1	l	1 1		1		1
	1	January	3.5	4.5			None		None
	1	February	3.5	4.5			None		None
	1	March	3.0	4.5			None		None
	1	April	2.5	4.5			None		None
	1	May	2.5	4.5			None		None
	1	June	3.5	4.5			None		None
	1	October	3.0	4.0			None		None
	1	November	3.0	4.5			None		None
	1	December	3.0	4.5			None		None
	1	I	1	l	1 1		I I		1
Rubicon	-  A	I	1	l	1 1		1 1		I
	1	Jan-Dec					None		None
	!	!	!	<u> </u>	!!!		!!!		!
433314:	! -	!	!	l	!!!		!!!		!
Manistee	-  A	!	!	!	!!!		!		
	!	Jan-Dec			! !		None		None
TT - 1.1		!	1	  -	!!!		! !		!
Kellogg	-I C		1 2.0	I I 3.0	!!!		l Name I		l None
	!	January	1 2.0	3.0   3.0			None		None
	1	February	2.0	3.0   3.0			None     None		None
	1	March	1 1.5	3.0 I 3.0			None		None
	1	April	1 2.0	1 3.0 1 3.0			None		None
	1	May  June	1 2.0	1 3.0 1 3.0			None		None
	1	October	1 2.0	1 2.5			None		None
	1	November	1 2.0	1 2.5 1 3.0			None		None
	1	November	1 2.0	1 3.0 1 3.0			None		None
		December	ı 2.U	ı 3.U	1		i none		I NOTE

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1		1
	group	1	1	l	depth		1		1
	ī	I	Ft	Ft	Ft		T I		1
	1	1	. —				1 1		1
433314:	i	i	i	İ	i i		i i		i
Ashwabay	- ј В	i	i	İ	i i		i i		i
-	i	January	3.5	4.5	i i		None		None
	i	February	3.5	I 4.5	i i		None		None
	i	March	3.0	I 4.5	i i		None		None
	i	April	2.5	4.5	i i		None		None
	i	May	1 2.5	I 4.5	i i		None		None
	i	June	3.5	I 4.5	i i		None		None
	i	October	1 3.0	I 4.0	i i		l None l		l None
	i	November	3.0	I 4.5	i i		l None l		l None
	i	December	3.0	1 4.5	i i		None		None
	i	i	 	 I	į i		· · · · · · · · · · · · · · · · · · ·		i
433326:	i	i	i	I	i i		i i		i
Rubicon	-i A.	i	i	I	i i		i i		i
	i	  Jan-Dec	i	I	i i		None		None
	i	1	i	I	i i		i		i
433379:	i	i	i	I	i i		i i		i
Allendale	i c	i	i	i	i i		i i		i
	;	January	1.0	2.5	i i		l None l		l None
	i	February	1 1.0	2.5	i i		None		None
	i	March	1 1.0	3.0	i i		None		None
	i	April	0.5	3.0	i i		None		None
	i .	May	0.5	3.0	' '		None		None
	i .	June	1 1.0	2.5	' '		None		None
	i .	July	1 1.5	2.5	' '		None		None
	1	August	1 2.0	2.5			None		None
	1	September	1 2.0	1 2.5	i i		None		None
	1	October	1 1.0	1 2.5	i i		None		None
	1	November	1 1.0	1 2.5			None		None
	1	December	1.5	2.5			None		None
	1	December	1 1.5	1 2.5			None		None
433515:	1	1	1	! !	: :		: :		-
Lupton	 -  A/D	1	1	! !	: :		: :		-
парсоп	-  A/D	  January	0.0	ı I >6.0	! !		None		   None
	1	-	0.0				None		None
	1	February	0.0	•	10.0-0.5				None
		March	•		10.0-0.51		Occasional		
	!	April	0.0			_	Frequent		None
	!	May	0.0		10.0-0.5	_	Frequent		None
	1	June	0.0		10.0-0.5		Occasional		None
	1	July	0.0	, , , , ,			None		None
	!	August	0.0	>6.0	! !		None		None
	!	September	0.0	>6.0			None		None
	!	October	0.0	>6.0			None		None
	1	November	0.0	>6.0	10.0-0.5	Brief	Occasional		None
		December	1 0.0	l >6.0	1 1		l None l		l None

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding	T	Flooding		
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc	
and soil name	logic	1	limit	limit	water		1		1	
	group	<u> </u>	<u> </u>	<u> </u>	depth	<u> </u>	<u> </u>		<u> </u>	
	1	1	Ft	Ft	Ft		1		1	
	1	1	Ι	Ι	1 - 1		1		1	
433515:	1	1	I	l	1 1		1		1	
Cathro	-  A/D	1	I	l	1 1		1		1	
	1	January	0.0	>6.0			None		None	
	1	February	0.0	>6.0			None		None	
	1	March	0.0	>6.0	10.0-0.5	Brief	Occasional		None	
	1	April	0.0		10.0-0.5	_	Frequent		None	
	1	May	0.0		10.0-0.5	Long	Frequent		None	
	1	June	0.0		10.0-0.5	Brief	Occasional		None	
	1	July	0.0	>6.0			None		None	
	1	August	0.0	>6.0			None		None	
	1	September	•	>6.0			None		None	
	1	October	0.0	>6.0	1 1		None		None	
	1	November	0.0		10.0-0.5		Occasional		None	
	1	December	0.0	>6.0			None		None	
	1	!	I		!!!		! !		1	
Tawas	-  A/D	1	!		!!!		!!!		I	
	1	January	0.0	>6.0			None		None	
	1	February	0.0		1 1		None		None	
	1	March	0.0		10.0-0.5		Occasional		None	
	!	April	0.0		10.0-0.5	_	Frequent		None	
	!	May	0.0		10.0-0.5	_	Frequent		None	
	!	June	0.0		10.0-0.5		Occasional		None	
	!	July	0.0	>6.0	! !		None		None	
	!	August	0.0	>6.0	! !		None		None	
	!	September		>6.0	! !		None		None	
	!	October	0.0	>6.0			None		None	
	!	November	0.0	•	10.0-0.5		Occasional		None	
	!	December	0.0	>6.0	! !		None		None	
122570	!	1	!	l	!!!		!!!		!	
133572:	1 5	1	!	l	!!!		!!!		!	
Portwing	-  D	 	1 40	l > c o	!!!		1		l None	
	!	January	4.0   4.0	>6.0   >6.0			None		,	
	-	February  March	1 4.0 1 4.0	>6.0   >6.0			None     None		None	
	-	April	1 1.0	1 2.5			None		None	
	-	IMDLII	1 3.5	2.5   >6.0			None		None	
	-	  Marr	3.5   1.0	1 2.5			None		   None	
	-	May	1 3.5	2.5   >6.0			None		None	
	-	  June	1 4.5	>6.0   >6.0			None		   None	
	-	July	1 4.5 I 5.5	>6.0   >6.0			None		None	
	-	August	1 5.5 I 5.5	>6.0   >6.0			None		None	
	-	September	5.5   5.0	>6.0   >6.0			None		None	
	1	October	1 4.5	>6.0   >6.0			None		None	
	1	November	4.5   1.0	1 2.5			None		None	
	1	1 10 A GUIDET	•		; ;		1 10116		1 40116	
	<u> </u>	  December	•				I None I		None	
	 	  December	4.0   4.0   4.0	>6.0   >6.0   >6.0	i i		None     None		;     	

Table 19.-Water Features-Continued

Hydro-	Month			100				
1113 0110	Montai	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
logic	1	limit	limit	water		l I		I
group	1	l	l	depth		l I		1
ī	ı	Ft	Ft	Ft		l I		I
1	I					I I		I
1	I	l	I	1 1		l I		I
D	I	I	I	1 1		l I		1
1	January	0.0	1.0			None		None
1	I	3.5	>6.0	1 1		l I		1
1	February	0.0	1.0			None		None
1	I	3.5	J >6.0	1 1		l l		I
1	March	0.0	1.0			None		None
1	I	3.5	J >6.0	1 1		l l		I
1	April	0.0	2.0			None		None
1	I	3.5	>6.0	1 1		l I		I
1	May	0.0	1.5			None		None
1	I	3.5	>6.0	1 1		l I		I
1	June	4.0	>6.0			None		None
1	July	5.0	>6.0			None		None
	_	5.0	>6.0	i i		None		None
i	September	5.0	>6.0	i i		None		None
İ	October	0.0	1.0	i i		None		None
i	i	I 4.0	>6.0	i i	i	i i		i
i	November	0.0	1.5	i i		None		None
i	i	3.5	>6.0	i i	i	i i		i
i	December	0.0	I 0.5	i i		I None I		l None
i	İ	3.5	>6.0	i i	i	i i		i
!	l .	l	! :	!!!	ļ	!!!		!
1 5	!	]	!	!!!		!		!
•	1.7	]	!	!!!				1 27
1	Jan-Dec			! !		None		None
1	1	l İ	 	; ;				!
IB		! 	:	; ;		;		;
•	l.Tanijaru	' 4 ∩	, , >60	·		l None I		l None
	· -	•	•	' '				None
	· -	•	•					None
•	•	•	•					None
	· -	•	•	i i				None
	· -	•	•	i i				None
•		•	•	i i				None
	· -		•	' '				None
	-	•	•					None
	· -	•	•					None
•	November	3.0	>6.0   >6.0			None		None
			. /0.0			1 140116		I MOHE
•	December	3.5	>6.0	i i		I None I		None
	group					group	group	group

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding	<u> </u>	Floodi	ng
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	I	limit	limit	water		1		I
	group	I	l		depth		1 1		I
	ī	Ī	Ft	Ft	Ft		T T		I
	1	I					1 1		I
433599:	1	1	I		1 1		1 1		1
Annalake	B	I	l		1 1		1 1		I
	1	January	3.0	4.5			None		None
	1	February	3.0	4.5			None		None
	1	March	2.5	5.0			None		None
	1	April	2.5	>6.0			None		None
	1	May	2.5	>6.0			None		None
	1	June	4.0	>6.0			None		None
	1	September	2.5	3.5			None		None
	1	October	2.5	4.0			None		None
	1	November	2.5	4.5			None		None
	1	December	2.5	4.5			None		None
	1	I	l	l	1 1		1		I
433600:	1	1	l	l	1 1		1		1
Annalake	B	I	l	l	1 1		1		I
	1	January	3.0	4.5			None		None
	1	February	3.0	4.5			None		None
	1	March	2.5	5.0			None		None
	1	April	2.5	>6.0			None		None
	1	May	2.5	>6.0			None		None
	1	June	4.0	>6.0			None		None
	1	September	2.5	3.5			None		None
	1	October	2.5	4.0			None		None
	1	November	2.5	4.5			None		None
	1	December	2.5	4.5			None		None
	1	I	l		1 1		1 1		I
433671:	1	I	l		1 1		1 1		I
Arnheim	l D	I	l	l	1 1		1 1		I
	1	January	2.0	>6.0			None	Brief	Rare
	1	February	2.5	>6.0			None	Brief	Rare
	1	March	1.0	>6.0			None	Long	Occasional
	1	April	0.0		10.5-0.5	_	Frequent	Long	Frequent
	1	May	0.0		10.5-0.5	_	Frequent	Long	Frequent
	1	June	1.0	>6.0			None	Long	Occasional
	1	July	2.0	>6.0			None	Brief	Rare
	1	August	2.5	, , , , ,			None	Brief	Rare
	1	September		>6.0			None	Brief	Occasional
	1	October	0.5	>6.0			None	Brief	Occasional
	1	November	0.0		10.5-0.5		Occasional	Brief	[Occasional
	1	December	0.5	>6.0	! !		None	Brief	Rare
422676	!	!	l	l	!!!		! !		!
433676:	! _	!	l	<u> </u>	!!!		!!!		!
Redrim	B	1.7	l		!!!				   None
		Jan-Dec					None		

Table 19.-Water Features-Continued

	1	I	Water	table	1	Ponding		Floodi	ng
National symbol	Hydro-		Upper		Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	I	limit	limit	water		l l		I
	group	I	l I	l	depth				1
	T	ı	Ft	Ft	Ft		l l		I
	1	I	ı — ı		. — .		l I		I
433679:	1	I	l I	l	1 1		l I		I
Lapoin	-  C	I	l I	l	1 1		I I		I
	1	April	1.5	2.5			None		None
	1	May	2.0	2.5			None		None
	1	October	2.0	2.5			None		None
	1	November	1.5	2.5			None		None
	1	December	2.0	2.5			None		None
	1	I	l I	l	1 1				1
433686:	1	I	l I	l	1 1		l I		1
Zeba	·  C	I	l I	l	1 1		l I		1
	1	January	1.5	2.5			None		None
	1	February	1.5	2.5			None		None
	1	March	1.5	2.5			None		None
	1	April	1.0	2.5			None		None
	1	May	1.5	2.5			None		None
	1	October	1.5	2.5			None		None
	1	November	1.0	2.5			None		None
	1	December	1.5	2.5			None		None
	1	I	l I	l	1 1		l I		I
433729:	1	I	l I	l	1 1		l l		1
Sultz	-  A	I	l I	l	1 1		l l		1
	1	Jan-Dec					None		None
	1	I	l I	l	1 1		l l		I
433739:	1	I	l I	l	1 1		l l		I
Moquah	·I C	I	l I	l	1 1		l l		I
	I	January	4.0	>6.0			None		None
	I	February	4.0	>6.0			None		None
		March	3.5	>6.0			None	Brief	Occasional
	I	April	2.5	>6.0			None	Brief	Frequent
	I	May	3.0	>6.0			None	Brief	Frequent
	•	June	3.5	>6.0	! !		None	Brief	Occasional
	1	July	4.0	>6.0	! !		None	Brief	Rare
	1	August	4.5	>6.0			None	Brief	Rare
	1	September		>6.0			None	Brief	Rare
	1	October	3.5	>6.0			None	Brief	Occasional
	1	November	3.0	>6.0			None	Brief	Occasional
	!	December	3.5	>6.0	! !		None	Brief	Rare
400000	1	!	  -	l					<u> </u>
433771.	1	I		l	! !				!
Beaches	!	I	!	l	! !				!
40000	!	!	!	l	! !				I .
433802:	!	I	!	l	! !				!
Udorthents, ravines	1	!	!	l	! !				I .
and escarpments	l c	  Jan-Dec	!	l	! !		   None		   None

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding	1	Floodi	ng
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1 1		1
	group	1	l	l	depth		1		1
	1	1	Ft	Ft	Ft		1		1
	1	1	ı —	ı —	. — .		1 1		I
452739.	1	1	I	l	1 1		1 1		I
Water	1	1	I	l	1 1		1 1		I
	1	1	I	l	1 1		1 1		1
452765:	1	1	l	l	1 1		1 1		1
Abbaye	l B	1	I	l	1 1		1 1		I
	I	April	1.5	2.5			None		None
	I	May	2.0	2.5			None		None
	!	October	2.0	2.5			None		None
	!	November	1.5	2.5			None		None
	!	December	2.0	2.5	! !		None		None
<b>.</b>	1	1	<u> </u>	l	!!!		! !		!
Lapoin	l C	12	1 -	l 2 -	!!!				1 37
	1	April	1.5   2.0	2.5   2.5			None		None
	!	May	2.0   2.0	•			None		None
	!	October	2.0   1.5	2.5   2.5			None		None
	!	November  December	1 2.0	2.5   2.5			None     None		None
	1	December	1 2.0	1 2.5			I None I		None
1383557:	!	1	!	 	: :				!
Au Gres	l I B	1	! !	 	: :		! ! ! !		!
Au Gles	1 5	  January	1 1 3.0	   >6.0	·		None		None
		February	1 4.0	) >6.0   >6.0	' '		None		None
	i	March	2.5	>6.0	·		None		None
		April	0.5	>6.0	i i		None		None
		May	1 1.0	>6.0   >6.0	·		None		None
	i	June	1 2.5	>6.0	i i		None		None
	i	July	3.5	>6.0	i i		None		None
	i	August	4.0	>6.0	i i		None		None
	i	September	3.0	>6.0	i i		l None l		l None
		October	2.0	>6.0	i i		None		None
	i	November	1.0	>6.0	i i		None I		None
	i	December	2.0	·   >6.0	i i		None		None
	İ	İ	İ	l	i i		i i		Ì
1383580:	I	1	I	l	1 1		1 1		1
Loxley	A/D	1	I	l	1 1		1 1		I
	1	January	1.0	>6.0			None		None
	1	February	1.0	>6.0			None		None
	1	March	0.5	>6.0			None		None
	1	April	0.0	•	10.0-0.5	Long	Occasional		None
	1	May	0.0	>6.0			None		None
		June	0.0	>6.0			None		None
		July	0.5	>6.0			None		None
		August	0.5	>6.0			None		None
	1	September		>6.0			None		None
	I	October	0.0	>6.0			None		None
	I	November	0.0	>6.0			None		None
		December	0.5	J >6.0	1 1		None		None

Table 19.-Water Features-Continued

		1	Water	table	I	Ponding	l	Floodi	ng
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1		1
	group	1	I	I	depth		1		1
	1	T	Ft	Ft	Ft		T T		ī
	1	I	. —				1 1		I
1383580:	1	I	I	I	1		1 1		I
Beseman	-  A/D	I	I	I	1		1 1		I
	1	January	1.0	>6.0			None		None
	1	February	1.0	>6.0			None		None
	1	March	0.5	>6.0			None		None
	1	April	0.0	>6.0	10.0-0.5	Long	Occasional		None
	1	May	0.0	>6.0			None		None
	1	June	0.0	>6.0			None		None
	1	July	0.5	>6.0			None		None
	1	August	0.5	>6.0			None		None
	I	September	0.5	>6.0			None		None
	1	October	0.0	>6.0			None		None
	1	November	0.0	>6.0			None		None
	1	December	0.5	>6.0			None		None
	1	I	l	I	1		1 1		1
Dawson	-  A/D	1	I .	l	1		1 1		1
	1	January	0.5	>6.0			None		None
	ı	February	0.5	>6.0			None		None
	1	March	0.5	>6.0			None		None
	ı	April	0.0	•	10.0-0.5		Occasional		None
	ı	May	0.0	>6.0			None		None
	ı	June	0.0	>6.0			None		None
	ı	July	0.5	>6.0			None		None
	ı	August	0.5	>6.0			None		None
	ı	September	0.5	>6.0			None		None
	ı	October	0.0	>6.0			None		None
	ı	November	0.0	>6.0			None		None
		December	0.5	>6.0			None		None
	!	!	!	!	! !		!!!		!
1383581:	/_	!	!	!	!!!		! !		!
Rifle	-  A/D	 	1	1	!				1
	!	January	0.0	>6.0	!		None		None
	1	February	0.0	>6.0			None		None
	!	March	0.0	•	10.5-0.5	•	Occasional		None
	!	April	0.0		10.5-0.5	-	Frequent		None
	!	May	0.0   0.0	•	10.5-0.5	_	Frequent		None
	!	June	I 0.0	>6.0   >6.0	10.5-0.5	Brief	Occasional    None		None
	-	July	1 0.0	>6.0   >6.0	I I	 	None		None
	-	August	•	>6.0   >6.0					•
	1	September  October	0.0   0.0	>6.0   >6.0			None     None		None
	1	November	1 0.0		10.5-0.5	l	None    Occasional		None
	1	December	1 0.0	>6.0   >6.0	10.5-0.5	Brier	None		None
	1	December	0.0	/0.0			None		None
1383603:	1	! 	i I	i I	1	! 			:
Cornucopia	' -I D	<u> </u>	' 	' 			· !		<u> </u>
	i -	  Jan-Dec			i		None		l None
	•	,	•	•	•		, 1,0110		,

Table 19.-Water Features-Continued

	1	I	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		I I		1
	group	1	I		depth		I I		1
	Ī	1	Ft	Ft	Ft		ī ī		1
	1	1					1 1		1
L383658:	i	i	İ	i İ	i i		i i		i
Deerton	i A	i	İ	I	i i		i i		i
	i	Jan-Dec	i		i i		None		None
	İ	İ	l	l	i i		i i		İ
Brownstone	B	İ	İ	l	i i		i i		i
	İ	Jan-Dec			i i		None		None
	İ	İ	İ	l	i i		i i		i
383660:	İ	İ	İ	l	i i		i i		i
Deerton	A	İ	İ	l	i i		i i		i
	İ	Jan-Dec			i i		None		None
	i	i	İ	i İ	i i		i i		i
Brownstone	B	i	İ	i İ	i i		i i		i
	İ	Jan-Dec			i i		None		None
	İ	İ	İ	l	i i		i i		i
.383662:	1	1	l	l	1		1		1
Abbaye	l B	1	l	l	1		1		1
	1	April	1.5	2.5			None		None
	1	May	2.0	2.5			None		None
	1	October	2.0	2.5			None		None
	1	November	1.5	2.5			None		None
	1	December	2.0	2.5			None		None
	1	I	I	l	1		I I		1
383665:	1	I	I	l	1		I I		1
Allendale	l C	I	I	l	1		I I		1
	1	January	1.0	2.5			None		None
	1	February	1.0	2.5			None		None
	1	March	1.0	3.0			None		None
	1	April	0.5	3.0			None		None
	1	May	0.5	3.0			None		None
	1	June	1.0	2.5			None		None
	1	July	1.5	2.5			None		None
	1	August	2.0	2.5			None		None
	1	September	2.0	2.5			None		None
	1	October	1.0	2.5			None		None
	1	November	1.0	2.5			None		None
	1	December	1.5	2.5			None		None
	1	1	I	I	1		1 1		1

Table 19.-Water Features-Continued

	1	I	Water		1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc
and soil name	logic	I	limit	limit			l l		1
	group	I	I	l	depth		l l		1
	ī	I	Ft	Ft	Ft		ı ı		1
	i	I		_	i — i		I I		i
383665:	i	i	i	i I	i i		i i		i
Wakeley	-ј в/D	i	i	i I	i i		i i		i
<u>-</u>	i ´	January	I 0.0	I 3.0	10.0-1.01	Long	Frequent		I None
	i	February	0.0	•	10.0-1.01	_	Frequent		l None
	•	March	0.0	•	0.0-1.0	_	Frequent		l None
	•	April	I 3.0	•	0.0-1.0	-	Frequent		l None
		May	0.0	3.5	10.0-1.01	-	Frequent		l None
		June	0.0	3.0	i i		None		None
	•	July	1.0	3.0	i i		l None l		None
		August	1.5	3.0	i i		l None l		None
		September	1.0	3.0	i i		l None l		None
		October	0.0	3.0	10.0-1.01	Long	Frequent		None
	•	November	0.0	3.0	10.0-1.01	_	Frequent		None
	i	December	0.0	3.0	10.0-1.01	Long	Frequent		None
	i	I	1	1	1 1	20119	l III		1
Kinross	-  A/D	i	i	<u> </u>	i i		; ;		i
	1 11,2	  January	0.0	1 2.0	i i		l None l		None
	i	l canaary	1 3.5	>6.0	; ;		1 10110 1		1
	i	  February	0.0	1 2.0	' '		l None I		l None
	i	lebraary	1 3.5	2.0	; ;		I None I		i none
	i	  March	1 0.0	2.0	i i		l None I		l None
	i	March	3.5	2.0	; ;		1 10116		i none
	1	  April	0.0	•	10.5-0.5	Long	Frequent		   None
	1	I	1 3.5	2.3   >6.0	10.5 0.5	Hong	rrequenc		i None
	1	  May	0.0	•	10.5-0.5	Long	Frequent		   None
	-	ımay	1 3.5	2.0   >6.0	10.5 0.5	Hong	rrequenc		i None
	1	ı   June	0.0	1.5			None		   None
	1	i ourie	1 3.5	1.5   >6.0			I None I		i None
	1	  July	0.5	1.0			None		   None
	-	loury	1 4.0	1.0   >6.0			None		None
	- !	   3 +	1 4.0 1 4.0	>6.0   >6.0			1		1 27
	!	August	1 4.0 1 4.0	>6.0   >6.0			None		None
	!	September	•		' '		None		,
	1	October	0.0	1.5			None		None
	!	137	4.0	>6.0	!!!		l		1
	1	November	0.0	2.5			None		None
	1	I	3.5	>6.0	!!!		! <u>!</u>		1
	!	December	0.0	2.5	! !		None		None
	1	I	1 3.5	l >6.0	1 1		ı l		1

Table 19.-Water Features-Continued

	1	I	Water	table	<u> </u>	Ponding	<u> </u>	Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	I	limit	limit	water		1 1		1
	group	1	l	<u> </u>	depth		<u> </u>		1
	1	1	Ft	Ft	Ft		1 1		1
	1	I	l	l	1 1		1 1		1
1383960:	1	I	I	l	1 1		1 1		1
Flink	l C	I	I	l	1 1		1 1		I
	1	January	3.5	4.5			None		None
	1	February	3.5	4.5			None		None
	1	March	2.5	4.5			None		None
	1	April	1.0	4.5			None		None
	1	May	1.5	4.5			None		None
	1	June	2.5	4.5			None		None
	1	July	3.5	4.5			None		None
		August	4.0	4.5			None		None
		September	3.5	4.5			None		None
		October	2.5	4.5			None		None
		November	2.0	4.5			None		None
	1	December	2.5	4.5			None		None
	1	I	I	l	1 1		1 1		I
1444357:	1	I	I	l	1 1		1 1		I
Arnheim	l D	I	l	I	1 1		1 1		1
		January	2.0	>6.0			None	Brief	Rare
		February	2.5	>6.0			None	Brief	Rare
		March	1.0	>6.0			None	Long	Occasional
		April	0.0	•	10.5-0.5	_	Frequent	Long	Frequent
		May	0.0	•	10.5-0.5	- 3	Frequent	Long	Frequent
		June	1.0	>6.0			None	Long	Occasional
		July	2.0	>6.0			None	Brief	Rare
		August	2.5	>6.0			None	Brief	Rare
		September		>6.0			None	Brief	Occasional
		October	0.5	>6.0			None	Brief	Occasional
	1	November	0.0	>6.0	10.5-0.5	Brief	Occasional	Brief	Occasional
	1	December	0.5	>6.0			None	Brief	Rare
	!	!	!	!	!!!		!!!		!
1444359.	!	!	!	!	!!		!!!		!
Beaches	!	!	!	!	!!		!!!		!
1444267	!	!	!	!	!!!		!!!		!
1444367:	!	!		!	!!!		!!!		!
Udorthents, ravines	_	!	!	!	!!!		!!!		!
and escarpments	l c	!	!	!	!!		! !		!
	!	Jan-Dec	!	!	! !		None		None
1444378:	!	!	!	!	!!!		!!!		!
	1 0	!	!	!	!!!		!!!		!
Wakefield	l c	1.7	   1						1 27
	!	January	1.5	2.5	1 1		None		None
	1	February	1.5	2.5			None		None
	!	March	1.5	2.5			None		None
	!	April	1.0	2.5	! !		None		None
	!	May	1.5	2.5	! !		None		None
	1	October	2.0	2.5	! !		None		None
	1	November	1.5	2.5	! !		None		None
	I	December	1.5	2.5			None		None

Table 19.-Water Features-Continued

	I	1	· ———	table		Ponding		Flood	_ <del></del>
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc
and soil name	logic	1	limit	limit	water		1		1
	group	1	l	l	depth		1		1
	T	1	Ft	Ft	Ft		I I		ī
	1	I					1 1		I
444379:	i	İ	İ	İ	i i		i i		İ
Wakefield	-i c	İ	İ	İ	i i		i i		i
	i	January	1.5	2.5	i i		None		None
	i	February	1.5	2.5	i i		None		None
	i	March	1.5	2.5	i i		None		None
	1	April	1.0	2.5			None		None
	i	May	1.5	2.5	i i		None		None
	i	October	2.0	2.5	i i		None		None
	i	November	1.5	2.5	i i		None		None
	i	December	1.5	2.5	i i		None		None
	i	İ	İ	i İ	i i		į į		İ
444388:	İ	I	I	I	ı i		ı i		I
Allendale	-i c	i	i	i İ	i i		i i		i
	i	January	1.0	2.5	i i		None		None
	i	February	1.0	2.5	i i		None		None
	i	March	1.0	I 3.0	i i		None		l None
	i	April	0.5	i 3.0	i i		l None l		l None
	i	May	0.5	3.0	i i		None		None
	i	June	1.0	2.5	i i		None		None
	i	July	1.5	1 2.5	i i		None		l None
	i	August	2.0	2.5	i i		None		None
	i	September	2.0	1 2.5	i i		None		l None
	i	October	1.0	2.5	i i		None		None
	i	November	1 1.0	1 2.5	i i		None		None
	i	December	1.5	1 2.5	i i		None		None
	i	I	1	1	i i		1 10110 1		1
444402:	i	i	i	i	i i		i i		i
Tonkey	-  B/D	i	i	i	i i		i i		i
10mcy	1 2,2	  January	1 1.0	2.5	i i		None		None
	i	l	1 5.0	2.5	i i		1 10110 1		1
	i	  February	1 1.0	2.5	i i		None		None
	i	I	1 5.5	2.5	i i		1 10110 1		1
	i	March	0.0	2.5	i i		None		None
	i	April	1 0.0	•	10.5-0.51		Frequent		None
	i	May	0.0	•	10.5-0.5	_	Frequent		None
	i	June	1 0.0	>6.0   >6.0			None		None
	i	July	1 2.0	>6.0	' '		None		None
	i	August	1 2.0	>6.0   >6.0	i i		None		None
	-	September	1 4.0	>6.0   >6.0			None		None
		October	0.0	•	10.5-0.5		None    Occasional		None
	-	Locroper	I 4.0	1.5   >6.0	10.5-0.5	prier	CCCastonat	- <b></b>	I MOTIG
	1	  Norrowhan	•	>6.0   2.5			Nors		   None
	-	November	0.0	2.5   >6.0			None		None
	1	  December:	4.5	•	!!!		Ners		1 27
	!	December	0.5	2.5	! !		None		None
	I	I	4.5	>6.0	1 1		1 1		1

Table 19.-Water Features-Continued

	ı	1	Water	table	1	Ponding		Floodi	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1		1
	group	1	l	I	depth		1		1
	ı	I	Ft	Ft	Ft		T T		ı
	1	1	Ι	Ι	1 _ 1		1 1		1
L444410:	-1	1	I	l	1 1		1 1		1
Tula	-  D	1	I	I	1 1		1		1
	I	January	5.5	>6.0			None		None
	I	February	5.5	>6.0			None		None
	ı	March	1.5	2.5			None		None
	ı	1	5.0	>6.0	1 1		1 1		1
	1	April	0.0	2.5			None		None
	ı	1	4.5	>6.0	1 1		1 1		1
	ļ	May	0.5	2.5			None		None
	!	!	4.5	>6.0	!!!		! !		!
	!	June	1.0	2.5	! !		None		None
	!		4.5	>6.0	!!!		! !		!
		July	5.5	>6.0	! !		None		None
	!	October	1.5	2.5	! !		None		None
	!	137	5.5	>6.0	!!!		1 77		1 27
	!	November	1.0	2.5	! !		None		None
	- !	 	5.5	>6.0	!!!		1		 
	!	December	1.5	2.0	! !		None		None
	!	1	5.5	>6.0	!!!		!!!		!
L444414:	-	1	:	! !	; ;		1 1		1
Lupton	-  A/D	1	! !	! !	: :		1 1		
Eupcon		  January	I 0.0	   >6.0	! !		None		None
		February	0.0	>6.0   >6.0			None		None
		March	0.0	•	10.0-0.5		Occasional		None
		April	0.0		10.0-0.51		Frequent		None
		May	0.0	•	10.0-0.5	_	Frequent		None
		June	0.0		10.0-0.5	_	Occasional		None
		July	0.0	) >6.0   >6.0		Prier	None		None
		August	0.0	>6.0	·		None		None
		September	0.0	>6.0	i i		None		None
		October	1 0.0	) >6.0   >6.0	i i		None		None
	•	November	0.0	•	10.0-0.51		Occasional		None
	i	December	0.0	>6.0			None		None
	i	I	l 0.0		i i		10110		1
Cathro	-  A/D	i	i	I	i i		i i		i
		January	I 0.0	I >6.0	i i		l None l		I None
		February	0.0	>6.0	i i		None		None
		March	0.0	•	10.0-0.51	Brief	Occasional		l None
	•	April	0.0	•	10.0-0.5		Frequent		None
		May	0.0		10.0-0.5	-	Frequent		None
		June	0.0		10.0-0.5	-	Occasional		None
	•	July	0.0		i i		None		None
		August	0.0	>6.0	i i		None		None
		September	0.0	>6.0	i i		None		None
		October	0.0	>6.0	i i		None		None
	•	November	0.0	•	10.0-0.5		Occasional		None
	•	December	0.0	>6.0			None		None

Table 19.-Water Features-Continued

	1	1	water	table	Ponding			Flooding		
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc	
and soil name	logic	1	limit	limit	water		1 1		1	
	group	1	I	I	depth		1		1	
	_ <del></del>	1	l Ft	l Ft	Ft				1	
	i	i		· —	; — ;		i i		i	
444414:	i	i	i	i	i i		i i		i	
 Гаwаs	A/D	i	i I	i	i i		i i		i	
		  January	0.0	>6.0	i i		None		None	
		February	0.0	· i >6.0	i i		l None l		l None	
	i	March	0.0	>6.0	10.0-0.51	Brief	Occasional		None	
	i	April	0.0	>6.0	10.0-0.5	Long	Frequent		None	
		May	0.0		10.0-0.51	-	Frequent		None	
		June	0.0	>6.0	10.0-0.5	-	Occasional		None	
	i	July	0.0	>6.0			None		None	
	İ	August	0.0	>6.0	i i		None		None	
	İ	September	0.0	>6.0	i i		None		None	
		October	0.0	>6.0	i i		None		None	
	i	November	0.0	·   >6.0	10.0-0.5	Brief	Occasional		None	
	İ	December	0.0	>6.0	ļ j		None		None	
444425:	 	 	 	 					 	
Lerch	I D	i	i i	i	i i		i i		i	
	i	January	0.0	2.0	10.0-1.01	Long	Frequent		None	
	i	i -	3.5	>6.0	i i	,	i i		i	
	i	February	0.0	2.0	0.0-1.0	Long	Frequent		None	
	İ	<u> </u>	3.5	>6.0	i i	-	i i		İ	
	i	March	0.0	2.0	0.0-1.0	Long	Frequent		None	
	i	i	3.5	>6.0	i i	,	i i		i	
	İ	April	0.0	2.5	0.0-1.0	Long	Frequent		None	
	i	i	3.5		i i	,	i i		i	
	i	May	0.0	2.0	0.0-1.0	Long	Frequent		None	
	İ	i	3.5	>6.0	i i	-	i i		İ	
	İ	June	0.0	1.5	0.0-1.0	Long	Frequent		None	
	İ	İ	3.5	>6.0	i i	-	i i		İ	
	İ	July	0.5	1.0	0.0-1.0	Brief	Occasional		None	
	İ	i -	4.0	>6.0	i i		i i		İ	
	İ	August	4.0	>6.0	0.0-1.0	Brief	Occasional		None	
		September	4.0		[0.0-1.0]		Occasional		None	
		October	0.0	1.5	0.0-1.0		Frequent		None	
	I	1	4.0	>6.0			i - i		1	
	İ	November	0.0	2.5	0.0-1.0	Long	Frequent		None	
	i	1	3.5	•	1 1	,	i i		i	
	i	December	0.0	•	10.0-1.01	Long	Frequent		None	

Table 19.-Water Features-Continued

	I	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc
and soil name	logic	I	limit	limit	water		l I		1
	group	I	I	l	depth		l I		1
	ī	1	Ft	Ft	Ft		I I		1
	1	1	. —				1		1
444425:	i	i	i	i İ	i i		i i		i
Herbster	. D	i	i	i İ	i i		i i		i
	i	January	0.0	1.0	i i		None		None
	i	i -	I 3.5	>6.0	i i		i i		i
	i	February	0.0	1.0	i i		None		None
	i	i	I 3.5	>6.0	i i		i i		i
	i	March	0.0	1.0	i i		None		None
	i	i	I 3.5	>6.0	i i		i i		i
	i	April	0.0	2.0	i i		I None I		I None
	i	i	3.5	>6.0	i i		i i		i
	i	May	0.0	1.5	i i		I None I		I None
	i	1	3.5	>6.0	i i		i i		i
	i	June	1 4.0	>6.0	i i		I None I		I None
	i	July	I 5.0	>6.0	i i		l None I		l None
		August	I 5.0	>6.0	i i		l None I		l None
		September		>6.0	i i		l None l		l None
	i	October	0.0	1.0	i i		l None l		None
	i	i	4.0	>6.0	i i		i i		i
	i	November	0.0	1.5	i i		I None I		None
	i	1	3.5	>6.0	i i		i i		i
	i	December	0.0	0.5	i i		I None I		None
	i	1	3.5	>6.0	i i		i i		i
	i	i	1	, , , , , , , , , , , , , , , , , , ,	i i		i		i
.444426:	i	i	i	' 	i i		i i		i
Portwing	. D	i	i i	' I	i i		i i		i
	i	January	I 4.0	l >6.0	i i		I None I		l None
	i	February	1 4.0	>6.0	i i		l None l		l None
	i	March	1 4.0	>6.0	i i		l None l		l None
	i	April	1.0	2.5	i i		l None l		None
	i	1	3.5	>6.0	i i		i i		i
	i	  May	1.0	2.5	i i		I None I		None
	i		3.5	>6.0	i i		i i		i
	i	June	4.5	>6.0	i i		I None I		None
	•	July	5.5	>6.0			None		None
		August	5.5	>6.0	i i		None		None
		September		>6.0	i i		None		None
	i	October	1 4.5	>6.0	i i		None		None
	i	November	1 1.0	2.5	i i		None		None
	i		1 4.0	2.5   >6.0			10110		1
	i	  December	1 4.0	>6.0   >6.0	i i		ı ı I None I		l None
	:	,			: !				

Table 19.-Water Features-Continued

1	1	Water		1	Ponding		Flood	ing
· -		Upper				Frequency	Duration	Frequency
logic	1	limit	limit	water		l I		1
group	1	l		depth		l I		1
ī	1	Ft	Ft	Ft		l I		T
1	I					l l		1
1	1	l	l	1 1		l l		1
-  D	1	l	l	1 1		l l		1
1	January	0.0	1.0			None		None
1	1	3.5	>6.0	1 1		l I		1
1	February	0.0	1.0			None		None
1	1	3.5	>6.0	1		l I		1
1	March	0.0	1.0			None		None
1	1	3.5	>6.0	1 1		l I		1
1	April	0.0	2.0			None		None
1	1	3.5	>6.0	1		l I		1
1	May	0.0	1.5			None		None
1	1	3.5		1		l l		I
1	June	4.0	>6.0			None		None
1	July	5.0	>6.0			None		None
1	August	5.0	>6.0			None		None
1	September					None		None
1	October		•			None		None
1	1			1 1		l l		I
I	November		•			None		None
I	1			1				ı
!	December		•			None		None
1		3.5	>6.0	! !				ļ
!	!			!!!		!!!		!
! _	!		!	!!!		!		!
- I D	1.7		  -	! !				1 27
!	Jan-Dec					None		None
!	!	l 1	l	! !		!		!
1 5	!	l 1	l	! !		!		!
-ו	l Ton Don		 	! !		l None l		   None
!	logu-pec		 			None		None
-		l I	 	1		! !		-
  -  R	i	! 	! !	;		:		<u> </u>
1 2	l.Tanuaru	. 4 ∩	ı I >6 ∩	i i		l None I		None
i .	_		•	i i				None
i	· -		•					None
i				i i				None
i	· -			i i				None
i	_			i i				None
i	•			i i				None
i	_			i i		None		None
i	_			i i				None
i	October	3.5	>6.0	i i		None I		None
					'			
1	November	3.0	l >6.0			None		None
	logic  group   	logic    group	Hydro-	logic     limit   limit   limit   lgroup	Hydro-   Month   Upper   Lower   Surface   logic     limit   limit   water   depth	Hydro-   Month     Upper   Lower   Surface   Duration   logic   limit   limit   water   depth	Hydro-	Hydro-   Month

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		1		1
	group	1	I	l	depth		1		1
	Ī	1	Ft	Ft	Ft		ī ī		1
	i	i	<u> </u>		i - i		i i		i
1444432:	i	i	i	i I	i i		i i		i
Gogebic	i c	i	i	i İ	i i		i i		i
<b>3</b>	i	January	I 1.5	I 2.5	i i		I None I		I None
	i	February	1.5	2.5	i i		l None I		l None
	i	March	1.5	2.5	i i		l None I		l None
	i	April	1.0	2.5	i i		l None I		l None
	i	May	1.5	2.5	i i		l None l		l None
	i	October	1 2.0	2.5	i i		l None l		l None
	i	November	1.5	2.5	i i		l None l		l None
	i	December	1.5	2.5	i i		l None l		l None
	i	1	i	, <u>-</u>	i i		1 1		1
1444435:	i	i	i	' 	i i		i i		i
Iosco	.i с	i	i	' 	i i		i i		i
	i	  January	i 1.0	l >6.0	i i		I None I		I None
	i	February	1 1.0	>6.0	i i		None		l None
	i	March	1 1.0	>6.0	i i		None		l None
	i	April	0.5	>6.0	i i		None		None
	i	May	1.0	>6.0	i i		None		None
	i	June	1 1.5	>6.0	i i		None		None
	i	July	1 3.0	>6.0	i i		None		l None
	i	August	1 4.0	>6.0	i i		None		None
	i	September	•	>6.0	i i		None		None
	i	October	1 2.5	>6.0	i i		None		None
	i	November	0.5	>6.0	i i		None		None
	i	December	1 1.0	>6.0	i i		None		None
	i	December	1 1.0	, , o. o	; ;		I None I		None
1444457:	i	<u> </u>	<u> </u>	! 	; ;		;		<u> </u>
Redrim	' -I В	<u> </u>		! 	; ;				<u> </u>
Treat Im	i -	  Jan-Dec	I	' I	i i		None		None
	i	1	i	' 	i i		1 1		1
1444459:	i	<u> </u>	<u> </u>	! 	; ;		;		<u> </u>
Zeba	.i c	i	i	' 	i i		i i		i
Leba		January	1.5	2.5	i i		l None l		l None
	i	February	1 1.5	2.5	i i		None		None
	i	March	1.5	1 2.5			None		None
	i	April	1 1.0	1 2.5	i i		None		None
	i	May	1 1.5	1 2.5	i i		None		l None
	i	October	1.5	1 2.5	i i		None		l None
	i	November	1 1.0	1 2.5			None		None
	;	December	1 1.5	1 2.5	' '		None		None
	1	1 peceumer	1 1.5	2.5	1 1		I MOTTE		1 HOHE

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		l I		1
	group	1	1	l	depth	l	l I		1
	T	1	Ft	Ft	Ft	l	l I		I
	1	I				I	l I		1
1444460:	1	1	I	I	1	I	l I		1
Abbaye	-  B	1	I	I	1	l I	l I		1
	1	April	1.5	2.5			None		None
	1	May	2.0	2.5			None		None
	1	October	2.0	2.5			None		None
	1	November	1.5	2.5			None		None
	1	December	2.0	2.5			None		None
	1	1	I	l	1		l I		1
Lapoin	-I C	1	1	l	1		l I		1
	1	April	1.5	2.5			None		None
	1	May	2.0	2.5			None		None
	1	October	2.0	2.5			None		None
	1	November	1.5	2.5			None		None
	1	December	2.0	2.5			None		None
	1	1	I	l	1	l I	l I		1
1444461:	1	1	I	I	1	l I	l l		1
Abbaye	-  B	1	I	l	1	l I	l I		1
		April	1.5	2.5			None		None
		May	2.0	2.5			None		None
		October	2.0	2.5			None		None
	I	November	1.5	2.5			None		None
	1	December	1 2.0	2.5	I		None		None
_		1	1		!		!		1
Zeba	-I C	1	!	!	!				1
		January	1.5	2.5			None		None
		February	1.5	2.5			None		None
	•	March	1.5	2.5			None		None
		April	1.0	2.5			None		None
		May	1.5	2.5			None		None
	•	October	1.5	2.5			None		None
	!	November	1.0	2.5			None		None
	!	December	1.5	2.5	!		None		None
1 4 4 4 4 7 7	!	1	!	l	!				!
1444477:		1	!	l	!				!
Cublake	-  A	   Tanana	1 2 0	1 4 0	!				1 27
		January	3.0   3.0	4.0   4.0		 	None		None
		February	•	•	1	'	None		None
	•	March	2.5   2.0	4.0   4.5		 	None		None
		April	•			 	None		,
		May	2.0	4.5		 	None		None
		June	3.0	4.0	1	'	None		None
		October	3.0   2.5	4.5   5.0			None		None
	•	November	•	5.0   4.5		 	None		None
	!	December	3.0	4.5	!		None		None

Table 19.-Water Features-Continued

	1	Month	Water table		Ponding			Flooding		
	Hydro-		Upper	Lower	Surface	Duration	Frequency	Duration	Frequency	
and soil name	logic	I	limit	limit	water		l I		1	
	group	I	1 1		depth		l I		1	
	ī	I	Ft	Ft	Ft				I	
	1	I	. — .				l I		1	
L444477:	İ	İ	i i		i i		i i		i	
Croswell	A	I	1 1		1 1		1		1	
	I	January	4.0	>6.0			None		None	
	I	February	5.0	>6.0			None		None	
	I	March	3.5	>6.0			None		None	
	1	April	2.0	>6.0			None		None	
	1	May	2.5	>6.0			None		None	
	1	June	4.0	>6.0			None		None	
	I	July	4.5	>6.0			None		None	
	1	August	5.0	>6.0			None		None	
	1	September	4.0	>6.0			None		None	
	1	October	3.5	>6.0			None		None	
	1	November	3.0	>6.0			None		None	
	1	December	3.5	>6.0			None		None	
	1	I	I I		1 1		l I		1	
Ashwabay	l B	I	I I		1 1		l I		1	
	1	January	3.5	4.5			None		None	
	1	February	3.5	4.5			None		None	
	1	March	3.0	4.5			None		None	
	1	April	2.5	4.5			None		None	
	1	May	2.5	4.5			None		None	
	1	June	3.5	4.5			None		None	
	1	October	3.0	4.0			None		None	
	1	November	3.0	4.5			None		None	
	1	December	3.0	4.5			None		None	
	1	I			1 1		l I		1	
L444478:	1	I			1 1		l I		1	
Cublake	A	I	1 1		1 1		l I		1	
	1	January	3.0	4.0			None		None	
	1	February	3.0	4.0			None		None	
	1	March	2.5	4.0			None		None	
	•	April	2.0	4.5			None		None	
	1	May	2.0	4.5			None		None	
	1	June	3.0	4.0			None		None	
	1	October	3.0	4.5			None		None	
	•	November	2.5	5.0			None		None	
	1	December	I 3.0 I	4.5	1 1		None		l None	

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		l l		1
	group	1	I	l	depth		l I		1
	1	ī	Ft	Ft	Ft		ı ı		ī
	1	I	. —				l I		1
1444478:	1	1	I	I	1		l l		1
Croswell	-  A	I	I	I	1		l l		1
	1	January	4.0	>6.0			None		None
	1	February	5.0	J >6.0			None		None
	1	March	3.5	>6.0			None		None
	1	April	2.0	J >6.0			None		None
	1	May	2.5	J >6.0			None		None
	1	June	4.0	J >6.0			None		None
	I	July	4.5	J >6.0			None		None
	I	August	J 5.0	J >6.0			None		None
	1	September	4.0	>6.0			None		None
	1	October	3.5	>6.0			None		None
	1	November	3.0	J >6.0			None		None
	i	December	3.5	>6.0	i		None		None
	1	I	I	I	1		l l		1
Ashwabay	-  B	I	I	I	1		l l		1
	1	January	3.5	4.5			None		None
	1	February	3.5	4.5			None		None
	I	March	3.0	4.5			None		None
	I	April	2.0	4.5			None		None
	I	May	2.5	4.5			None		None
	I	June	3.5	4.5			None		None
	I	October	3.0	4.0			None		None
	1	November	3.0	4.5			None		None
	I	December	3.0	4.5			None		None
	1	1	I	l	1		l l		1
1444479:	1	1	I	l	1		l l		1
Morganlake	-I C	1	I	I	1		l l		1
	1	January	1.5	2.5			None		None
	1	February	1.5	2.5			None		None
	1	March	1.5	2.5			None		None
	1	April	1.5	2.5			None		None
	1	May	1.5	2.5			None		None
	1	October	2.0	2.5			None		None
	I	November	1.5	2.5			None		None
	1	December	1.5	4.0			None		None
	1	1	I	l	1		l l		1
1444480:	1	1	I	l	1		l l		1
Morganlake	-I C	1	I	l	1		l I		1
	1	January	1.5	2.5			None		None
	1	February	1.5	2.5			None		None
	1	March	1.5	2.5			None		None
	1	April	1.5	2.5			None		None
	1	May	1.5	2.5			None		None
	1	October	2.0	2.5	i		None		None
	1	November	1.5	2.5	i		None		None
	i	December	1.5	2.5	i i		None		None
	i	i	i	i	i		i i		i

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding	1	Flooding		
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency	
and soil name	logic	1	limit	limit	water		1		1	
	group	1	l	l	depth		l I		1	
	1	1	Ft	Ft	Ft		l l		1	
	1	I	Ι —	Ι	1 - 1		l I		1	
1444481:	1	1	I	l	1 1		1		1	
Kellogg	-  C	1	I	l	1 1		1		1	
	1	January	2.0	3.0			None		None	
	1	February	2.0	3.0			None		None	
	1	March	2.0	3.0			None		None	
	I	April	1.5	] 3.0			None		None	
	1	May	2.0	3.0			None		None	
	1	June	2.0	3.0			None		None	
	1	October	2.0	2.5			None		None	
	1	November	2.0	3.0			None		None	
	1	December	2.0	3.0			None		None	
Allendale	-I C	1	1	 					1	
Allendare	-1 6	  January	1 1.0	ı I 2.5			ı l I None l		   None	
	;	February	1 1.0	1 2.5	i i		None		None	
	-	March	1 1.0	1 3.0	' '		None		None	
	•	April	1 0.5	1 3.0 I 3.0			None		None	
		May	0.5	3.0	' '		None		None	
	-	June	1 1.0	1 2.5			None		None	
	-	July	1 1.5	2.5			None		None	
	-	August	1 2.0	2.5			None		None	
	-	September	1 2.0	1 2.5			None		None	
	-	October	1 1.0	2.5			None		None	
	-	November	1 1.0	1 2.5			None		None	
	-	December	1 1.5	1 2.5			None		None	
		1 December	1 1.5	2.3 			I None I		i None	
Ashwabay	' -I В	<u> </u>	i i	! !	; ;		;		;	
	i -	  January	3.5	I 4.5	i i		None		None	
	i	February	3.5	1 4.5	i i		l None l		l None	
	i	March	3.0	1 4.5	i i		None		None	
	i	April	2.5	1 4.5	i i		None		None	
	i	May	1 2.5	1 4.5	i i		None		None	
		June	3.5	1 4.5	i i		None		None	
	i	October	3.0	1 4.0	i i		l None l		l None	
	i	November	3.0	1 4.5	i i		None		None	
	i	December	3.0	4.5	i i		None		None	
1444482:	1		1	ļ	!!!		! !		1	
1444482:   Kellogg	-  C		! 	! 			ı   		 	
22	İ	January	2.0	3.0	i i		None		None	
	1	February	2.0	3.0	i i		None		None	
	1	March	2.0	3.0	i i		None		None	
	1	April	1.5	3.0	i i		None		None	
		May	2.0	3.0	i i		None		None	
		June	2.0	3.0	i i		None		None	
	I	October	2.0	2.5	i i		None		None	
	i	November	2.0	3.0	i i		None		None	
	i	December	2.0	3.0	i i		None		None	

Table 19.-Water Features-Continued

<del>-</del>	Hydro-	Month							
		Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	I	limit	limit	water		l I		I
	group	I	l	I	depth		l I		I
	ī	1	Ft	Ft	Ft		i i		1
	1	1					1 1		1
444482:	i	i	I	i i	i i		i i		i
Allendale	i c	i	I	i i	i i		i i		i
	i	January	1.0	2.5	i i		None		None
	i	February	1.0	2.5	i i		None I		l None
	i	March	1.0	I 3.0	i i		None		None
	i	April	0.5	i 3.0	i i		None I		l None
	i	May	0.5	3.0	i i		None		None
	i	June	1.0	1 2.5	i i		None I		l None
	i	July	1.5	1 2.5	i i		None I		l None
	i	August	2.0	2.5	i i		None I		l None
	i	September	2.0	1 2.5	i i		None I		l None
	i	October	1.0	1 2.5	i i		None I		l None
	i	November	1.0	1 2.5	i i		None I		l None
	i	December	1.5	1 2.5	i i		None I		l None
	i	İ	i	i	i i		i i		i
Ashwabay	В	i	I	i i	i i		i i		i
2	i	January	I 3.5	4.5	i i		None		None
	i	February	3.5	4.5	i i		None		None
	i	March	3.0	4.5	i i		None		None
	i	April	2.5	4.5	i i		None		None
	i	May	2.5	4.5	i i		None		None
	i	June	3.5	4.5	i i		None		None
	i	October	3.0	I 4.0	i i		None		None
	i	November	3.0	4.5	i i		None		None
	İ	December	3.0	4.5	i i		None		None
	İ	İ	İ	İ	i i		i i		İ
444486:	İ	İ	İ	İ	i i		i i		İ
Sedgwick	D	İ	İ	İ	i i		i i		İ
-	İ	January	1.0	2.5	i i		None		None
	İ	February	1.0	2.5	i i		None		None
	İ	March	0.5	2.5	i i		None		None
	I	April	0.5	2.5	i i		None		None
	I	May	0.5	2.5	i i		None		None
	I	June	0.5	1.5	i i		None		None
	I	October	1.0	1.5	i i		None		None
	i	November	0.5	2.5	i i		None		None
	I	December	0.5	2.5	i i		None		None
	I	I	I	I	ı i		i i		1

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flooding		
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency	
and soil name	logic	1	limit	limit	water		1		1	
	group	1	l	I	depth		1		1	
	ī	ī	Ft	Ft	Ft	1	T T		ī	
	1	I				1	1 1		1	
1444486:	i	i	İ	i İ	i i	ĺ	i i		i	
Munuscong	-  B/D	İ	İ	İ	i i	]	i i		i	
-	i	January	0.0	3.0	i i		None		None	
	i	February	0.0	3.0	i i		None		None	
	i	March	0.0	3.0	i i		None		None	
	i	April	0.0	3.0	10.5-0.5	Long	Frequent		None	
	i	May	0.0	3.0	10.5-0.5	Long	Frequent		None	
	i	June	0.5	3.0	i i		None		None	
	i	July	1.0	I 3.0	i i		None		None	
	i	August	1.5	2.5	i i		None		None	
	i	September	1.5	2.0	i i		None		None	
	i	October	0.5	1 2.0	i i		l None l		None	
	i	November	0.0	I 3.0	10.5-0.5	Brief	Occasional		None	
	i	December	0.0	i 3.0	i i		l None l		None	
	i	İ	i	i	i i	ĺ	i i		i	
444487:	i	i	I	i i	i i	ĺ	i i		i	
Superior	.i с	i	I	i i	i i	ĺ	i i		i	
-	i	April	0.5	2.0	i i		l None l		l None	
	i	May	1.0	1 2.0	i i		None		None	
	i	October	I 1.5	I 2.0	i i		l None l		l None	
	i	November	1.0	1 2.0	i i		l None l		None	
	i	December	1.0	1.5	i i		l None l		None	
	i	İ	i	i	i i	ĺ	i i		i	
Sedgwick	- i в	i	I	i i	i i	ĺ	i i		i	
	i	January	I 1.0	I 2.5	i i		l None l		I None	
	i	February	1.0	1 2.5	i i		l None l		None	
	i	March	0.5	1 2.5	i i		l None l		None	
	i	April	0.5	1 2.5	i i		l None l		None	
	i	May	0.5	1 2.5	i i		None		None	
	i	June	0.5	1.5	i i		None		None	
	i	October	1.0	1.5	i i		l None l		None	
	i	November	0.5	1 2.5	i i		l None l		None	
	i	December	0.5	1 2.5	i i		None		None	
	i	i	i	i	i i	i I	i i		i	
444488:	i	i	I	I	i		i i		i	
Superior	i c	i	I	I	i i		į į		i	
	i	  April	I 0.5	1 2.0	i i		None		None	
	i	May	1.0	1 2.0	i i		None		None	
	i	October	1.5	2.0	i i		None		None	
	i	November	1.0	1 2.0	i i		None		None	
	i	December	1.0	1 1.5	i i		None		None	
	i	,	, = I	. =.5 I	i	i			1	

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water		I .		1
	group	1	I	l	depth		l		1
	T	ī	Ft	Ft	Ft	1			ī
	1	I					I .		1
1444488:	i	İ	İ	İ	į i		i		İ
Sedgwick	-  D	I	I	I	1				1
_	1	January	1.0	2.5			None		None
	1	February	1.0	2.5			None		None
	1	March	0.5	2.5			None		None
	1	April	0.5	2.5			None		None
	1	May	0.5	2.5			None		None
	1	June	0.5	1.5			None		None
	i	October	1.0	2.5			None		None
	i	November	0.5	2.5			None		None
	i	December	0.5	2.5			None		None
	i	İ	İ	İ	i		i		i
1444489:	i	İ	İ	İ	i		i		i
Sultz	-   A	İ	İ	İ	i		i		i
	i	Jan-Dec	i	i			None		None
	i	İ	İ	İ	i		i		i
Ashwabay	-  B	İ	İ	İ	i		i		i
<del>-</del>	i	January	1 3.5	1 4.5	i		None		None
	i	February	I 3.5	4.5	i		None		None
	i	March	i 3.0	4.5	i		None		None
	i	April	1 2.5	1 4.5			None		None
	i	May	1 2.5	I 4.5			None		None
	i	June	i 3.5	I 4.5			None		None
	i	October	i 3.0	I 4.0			None		None
	i	November	i 3.0	1 4.5			None I		None
	i	December	i 3.0	I 4.5			None I		None
	i	1	i	i	i		i		i
Rubicon	-I A	i	i	i i	i i		i		i
	i	  Jan-Dec	i	I	i i		None		None
	i	i	i	i i	i		i		i
1444492:	i	i	i	i i	i i		i		i
Manistee	-  A	i	i	i İ	i i	i	i		i
	i	Jan-Dec	i		i i		None		None
	i	i	i	i i	i i		i		i
Kellogg	i c	i	i	i i	i i		i		i
33	i	January	2.0	I 3.0			None		None
	i	February	1 2.0	I 3.0	i		None		None
	i	March	1 2.0	I 3.0	i		None I		l None
	i	April	1.5	3.0	i i		None		None
	i	May	1 2.0	3.0			None		None
	i	June	1 2.0	3.0			None		None
	i	October	1 2.0	2.5			None		None
	i	November	1 2.0	3.0			None		None
	i	December	1 2.0	3.0			None		None
		1			i				

Table 19.-Water Features-Continued

	1	I	Water		1	Ponding		Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc
and soil name	logic	1	limit	limit			l l		I
	group	<u> </u>	<u> </u>	<u> </u>	depth	l	<u> </u>		<u> </u>
		1	Ft	Ft	Ft		I I		1
	I	I	ı —				l I		I
444492:	I	I	I		1 1		l I		1
Ashwabay	l B	1	I	l	1 1		1 1		1
_	1	January	3.5	4.5			None		None
	İ	February	3.5	4.5	i i		None		None
	İ	March	3.0	4.5	i i		None		None
	İ	April	2.5	4.5	i i		None		None
		May	2.5	4.5	i i		None		None
	i	June	I 3.5	4.5	i i		None		None
	i	October	I 3.0	4.0	i i		I None I		l None
	•	November	i 3.0	4.5	i i		l None I		l None
	i	December	i 3.0	4.5	i i		l None I		l None
	i	i	i	, 	i i		i i		i
444506:	i	i	i	İ	i i		i i		i
Keweenaw	I A	i	i	i	i i		i i		i
	i	  Jan-Dec	i		i i		I None I		l None
	i	1	i	i	i i		i i		i
Rubicon	i A	i	i	i	i i		i i		i
	i	  Jan-Dec	i	' 	i i		l None I		l None
	i	l Dec	i	! 	; ;		1 1		1
444507:	i	i	i	! 	; ;		;		i
Keweenaw	l A	! 	<u> </u>	! 	;		;		;
neweenaw	1 4	  Jan-Dec	' 	 	· i		l None l		l None
		I Dec	<u>.</u>	i i	;	 	I HOILE I		I None
Rubicon	l A	! 	<u> </u>	! 	;		;		;
Rubicon	1 4	Jan-Dec			i i		None		l None
		I Dec	! !	! !	;		I MOITE I		I Mone
444585:		1	! !	! !	;		! ! ! !		
Meehan, beaches	l IB	1	! !	! !	;		! ! ! !		
Meenan, Deaches	•	  January	I I 3.0	ı I >6.0	! !		!		l None
		February	1 4.0	>6.0   >6.0			 		None
	•	March	1 2.5	>6.0   >6.0			 		None
	•	•	1 0.5	>6.0   >6.0	i i		 		None
		April	I 1.0	>6.0   >6.0			 		l None
		May	•	>6.0   >6.0			 		
		June	2.5				 		None
		July	3.5	>6.0			!		None
		August	4.0	>6.0					None
		September	3.0	>6.0			! !		None
	•	October	2.0	>6.0			! !		None
	1	November	1.0	>6.0					None
		December	1 2.0	>6.0	1 1		l l		None

Table 19.-Water Features-Continued

	I	1	·	table	<u> </u>	Ponding	<u></u>	Floodi	
National symbol	Hydro-		Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic		limit	limit	water		I I		I
	group	<u> </u>	<u> </u>	<u> </u>	depth		<u> </u>		<u> </u>
	1	1	<u>Ft</u>	Ft	<u>Ft</u>		I I		I
	1	1	Ι		1 -		1		1
1444586:	1	1	I	l	1 1		1		1
Wurtsmith, beaches	-  A	1	I	l	1 1		I I		I
	1	January	4.0	>6.0					None
		February	5.0	>6.0					None
	•	March	3.5	>6.0					None
		April	2.0	>6.0	! !		! !		None
		May	2.5	>6.0	! !		! !		None
		June	4.0	>6.0	! !		! !		None
		July	4.5	>6.0	! !		! !		None
		August	5.0	>6.0	! !		! !		None
		September	4.0	>6.0					None
		October	3.5	>6.0	' '				None
	•	November	3.0	>6.0			 		None
	!	December	3.5	>6.0					None
1444587:	!		!	 	: :		! !		!
Grayling, beaches	  -   A	1	:	 	; ;		: :		!
Graying, beaches		  Jan-Dec		l I –––	! !		ı ı I None I		   None
		I Dec	! !	l I	; ;		I MOTTE I		i none
1529830:	<u> </u>	i	<u>.</u>	! !	; ;		: :		<u> </u>
Meehan, beaches	·IB	¦	i	! 	; ;		; ;		i
Meenan, Deaches	•	  January	3.0	   >6.0	i i		' '		None
		February	1 4.0	>6.0	i i		i i		None
		March	2.5	>6.0	i i		i i		None
		April	0.5	>6.0	i i		i i		None
		May	1.0	>6.0	i i		i i		None
		June	2.5	>6.0	i i		i i		None
		July	3.5	·   >6.0	i i		i i		None
	İ	August	4.0	>6.0	i i		i i		None
		September	3.0	>6.0	i i		i i		None
	1	October	2.0	>6.0					None
	1	November	1.0	>6.0					None
	1	December	2.0	>6.0					None
	1	1	I	l	1 1		1		1
1700372:	1	1	I	l	1 1		1		1
Loxley	·  A/D	1	I	l	1 1		I I		I
	1	January	1.0	>6.0			None		None
		February	1.0	>6.0			None		None
		March	0.5	>6.0	1 1		None		None
		April	0.0		10.0-0.5	_	Occasional		None
		May	0.0	>6.0	! !		None		None
		June	0.0	>6.0	! !		None		None
		July	0.5	>6.0	! !		None		None
		August	0.5	>6.0			None		None
		September	0.5	>6.0	! !		None		None
	•	October	0.0	>6.0	! !		None		None
		November	0.0	>6.0	! !		None		None
	1	December	0.5	>6.0			None		None

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding		Flooding		
National symbol	Hydro-		Upper	Lower	Surface	Duration	Frequency	Duration	Frequency	
and soil name	logic	I	limit	limit	water		1 1		1	
	group	1	I	1	depth		1 1		1	
		1	Ft	Ft	Ft		1		1	
	1	1	. —	. —			1 1		1	
L700372:	1	I	I	I	1 1		1 1		I	
Beseman	-  A/D	I	I	I	1 1		1 1		I	
	1	January	1.0	J >6.0			None		None	
	1	February	1.0	J >6.0			None		None	
	1	March	0.5	>6.0			None		None	
	1	April	0.0	>6.0	10.0-0.5	Long	Occasional		None	
	1	May	0.0	>6.0			None		None	
	1	June	0.0	>6.0			None		None	
	1	July	0.5	>6.0			None		None	
	1	August	0.5	>6.0			None		None	
	1	September	0.5	>6.0			None		None	
	1	October	0.0	>6.0			None		None	
	1	November	0.0	>6.0			None		None	
	1	December	0.5	>6.0			None		None	
	1	1	I	I	1 1		1		1	
Dawson	·  A/D	1	I	I	1 1		1 1		1	
	1	January	0.5	>6.0			None		None	
	1	February	0.5	>6.0			None		None	
	1	March	0.5	J >6.0			None		None	
	1	April	0.0	>6.0	10.0-0.5	Long	Occasional		None	
	1	May	0.0	>6.0			None		None	
	1	June	0.0	>6.0			None		None	
	1	July	0.5	>6.0			None		None	
	1	August	0.5	>6.0			None		None	
	1	September	0.5	>6.0			None		None	
	1	October	0.0	>6.0			None		None	
	1	November	0.0	>6.0			None		None	
	1	December	0.5	>6.0			None		None	
	1	1	I	I	1		1 1		I	
L700373:	1	1	I	I	1 1		1 1		1	
Rifle	·  A/D	1	I	I	1		1 1		1	
	1	January	0.0	>6.0			None		None	
	1	February	0.0	>6.0			None		None	
	1	March	0.0		10.5-0.5		Occasional		None	
	1	April	0.0	•	10.5-0.5	_	Frequent		None	
	1	May	0.0	•	10.5-0.5	_	Frequent		None	
	1	June	0.0	•	10.5-0.5		Occasional		None	
	1	July	0.0	>6.0			None		None	
	1	August	0.0	>6.0			None		None	
	1	September	0.0	>6.0			None		None	
	1	October	0.0	>6.0	1 1		None		None	
	1	November	0.0	•	10.5-0.5		Occasional		None	
	1	December	0.0	>6.0			None		None	
	1	1	I	1	1 1		1 1		1	

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding	1	Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequency
and soil name	logic	1	limit	limit	water	l	I I		1
	group	1	I	I	depth	l	I I		1
	ī	ī	Ft	Ft	Ft	l	ī ī		T
	1	1				Ì	1 1		1
700374:	İ	İ	İ	İ	i i		i i		İ
Allendale	C	İ	l	İ	i i	l	i i		İ
	1	January	1.0	2.5			None		None
	1	February	1.0	2.5			None		None
	1	March	1.0	3.0			None		None
	1	April	0.5	3.0			None		None
	1	May	0.5	3.0			None		None
	1	June	1.0	2.5			None		None
	1	July	1.5	2.5			None		None
	1	August	2.0	2.5			None		None
	1	September	2.0	2.5			None		None
	1	October	1.0	2.5			None		None
	1	November	1.0	2.5			None		None
	Ì	December	1.5	2.5	i i		None		None
Wakelev	l ·  B/D	!	l	l	1	1	!!!		!
Wakeley	ין עי	   Tomom	I I 0.0	ı I 3.0	10.0-1.0	l Long	l Emagniant I		l None
	!	January	1 0.0	1 3.0 1 3.0	10.0-1.0		Frequent     Frequent		None
	!	February  March	I 0.0	1 3.0 1 3.0	10.0-1.0				None
	!	•	I 3.0	3.0   >6.0			Frequent		,
	!	April	1 0.0	1 3.5	0.0-1.0   0.0-1.0		Frequent		None
	!	May		1 3.5 1 3.0	10.0-1.0		Frequent		None
	!	June	0.0				None		None
	!	July	1.0	3.0	!		None		None
	!	August	1.5	3.0	!		None		None
	!	September	1.0	3.0			None		None
	1	October	0.0	3.0	0.0-1.0		Frequent		None
	1	November	0.0	3.0	10.0-1.0		Frequent		None
	I	December	0.0	3.0	0.0-1.0	Long	Frequent		None
	1	1	l	I					1

Table 19.-Water Features-Continued

!	l	1	Water	table	1	Ponding	1	Floodi	ng
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc
and soil name	logic	I	limit	limit	water		1		I
T T T T T T T T T T T T T T T T T T T	group	I	l		depth		1		I
ı	I	I	Ft	Ft	Ft		<u> </u>		
į	I	I	_	<u> </u>	i - i		i i		i
L700374:	' 	i		! 	i i		i i		i
Kinross	A/D	i		! 	i i		i i		i
		  January	0.0	2.0	i i		None		None
,	' 	 	3.5	>6.0	i i		1 1		1
,	' 	  February	0.0	2.0	i i		l None l		l None
,	' 	1	3.5	>6.0	i i		1 1		1
	' 	  March	0.0	2.0	i i		l None l		None
	! 	1	3.5	>6.0	; ;		1 10110 1		1 110110
,	! 	  April	0.0		10.5-0.5	Long	Frequent		l None
,	! 	I	3.5	>6.0	10.5 0.5	Hong	rreduenc		i Hone
,	! !	  May	0.0		10.5-0.51	Long	Frequent		None
,	! !	May	3.5	>6.0	10.5 0.5	Hong	rreduenc		i None
,	! !	  June	0.0	1.5	i i		None		l None
,	! !	l	3.5	>6.0	; ;		I None I		I None
ļ	 	  July	0.5	1.0			I None I		l None
ļ	 	loury	1 4.0	>6.0			I NOILE		None
ſ	 	  August	1 4.0	>6.0   >6.0			I None I		l None
ſ				>6.0   >6.0			None		None
ſ		September					,		,
	!	October	0.0	1.5			None		None
	!		4.0	>6.0	!!!				l Mana
	<u> </u>	November	0.0	2.5	! !		None		None
	<u> </u>	 	3.5	>6.0	!!!				1 27
	ļ	December	0.0	2.5	! !		None		None
	ļ	!	3.5	>6.0	!!!		!!!		!
	ļ	!			!!		!!!		!
L702605:	! -	!			!!		!!!		!
Menominee	•	!			!!		! !		!
		Jan-Dec					None		None
					!!!				1
L702606:					!!!				1
Deerton	l A				!!!				1
	l	Jan-Dec					None		None
	l	I	l		1 1		1		I
Brownstone		I	l		1 1		1		I
		Jan-Dec					None		None
	l	l	l		1 1		1		I
L702607:	l	I			1 1		1		I
Deerton	•	I			1 1		1		I
!	l	Jan-Dec					None		None
	1	1	l	1	1 1		1		1
l l	I								•
Brownstone	l   B	İ	i	İ	i i		i i		i

Table 19.-Water Features-Continued

	1	1	Water	table	1	Ponding	1	Flood	ing
National symbol	Hydro-	Month	Upper	Lower	Surface	Duration	Frequency	Duration	Frequenc
and soil name	logic	I	limit	limit	water	1	1		1
	group	I	I	l	depth	1	1		1
	ī	1	Ft	Ft	Ft				1
	1	I				1	1		1
.702608:	i	i	i	I	i i	i	i		i
Abbaye	-  B	İ	İ	l	i i	i	i		i
-	İ	April	1.5	2.5	i i	i	None		None
	1	May	2.0	2.5			None		None
	1	October	2.0	2.5			None		None
	1	November	1.5	2.5			None		None
	1	December	2.0	2.5			None		None
	1	1	I	l	1 1	1			1
711685:	1	1	I	l	1 1	1			1
Cublake	-  A	1	I	l	1 1	1			1
	1	January	3.0	4.0			None		None
	1	February	3.0	4.0			None		None
	1	March	2.5	4.0			None		None
	1	April	2.0	4.5			None		None
	1	May	2.0	4.5			None		None
	1	June	3.0	4.0			None		None
	1	October	3.0	4.5			None		None
	1	November	2.5	5.0			None		None
	1	December	3.0	4.5			None		None
	1	1	I	l	1 1	I	1		1
Keweenaw	-  B	1	I	l	1 1	1	I .		1
	1	Jan-Dec	I				None		None
	1	1	I	I	1 1	ĺ	l I		1

Table 20.—Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that data were not estimated)

Map unit symbol	l	Restric	tive layer	Potential	Risk of corrosion		
and soil name	1	Depth			_   for	Uncoated	l .
	Kind	to top	Thickness	Hardness	frost action	steel	Concrete
	I	In	<u>In</u>		1 1		I
	I	1	1 1		1 1		I
433292:	  -	!	!!!		! !		!
Lerch					High	High	Moderate
Herbster	l I Abrunt textural	   40-60	I 40-60 I	Noncemented		High	ı   Moderate
1101255001	change	1	1 10 00 1	Noncemen cea	1100021000	g	l
		i	i i		i i		i
433296:	I		1 1		1 1		I
Cublake					Low	Low	Moderate
	<u> </u>	1	!!!		! !	_	!
Croswell					Low	Low	Moderate
Ashwabay	l I	 			l Low I	Low	   Moderate
ASIIWADAY	! 	i	i i		1 204 1	TOW	Moderace 
433299:	i İ	i	i i		i i		i
Cublake					Low	Low	Moderate
	I	I	1 1		1 1		I
Croswell			! !		Low	Low	Moderate
Ashwabay	   ===	 			l Low l	Low	   Moderate
Ashwabay	 	 			I TOM I	TOM	Moderate
433300:	: 	i	i i		i i		i I
Kellogg			i i		Low	High	Moderate
	l	1	1 1		1 1		l
Allendale	ļ		! !		Moderate	High	Moderate
3 above been	 	 				T	
Ashwabay	<del></del> 				Low	Low	Moderate
433301:	! 	i	; ;		; ;		! 
Kellogg		i	i i		Low	High	Moderate
	I		1 1		1 1	_	I
Allendale					Moderate	High	Moderate
	  -	!	!!!		! !	_	<u> </u>
Ashwabay					Low	Low	Moderate
433304:	! !	 	: :		! ! ! !		! !
Sedgwick	' 		i i		High	High	   Moderate
	i İ	i	i i		i i		İ
Munuscong					High	High	Low
	!	1	1		1		ļ
433305:	  -	!	!!			Mr. A	 
Superior	 				Moderate	Moderate	Moderate
Sedgwick	l 	· 			High	High	ı   Moderate
	I	i	; ;		1		

Map unit symbol	<u> </u>	Restric	tive layer	Potential	Risk of corrosion		
and soil name	'	Depth			for		I
l	Kind		Thickness	Hardness	frost action	Uncoated steel	Concrete
	l	In	In		T I		l
ĺ	I	ı —	ı — ı		1 1		l
433309:	1	I	I I		1 1		l
Superior			! !		Moderate	Moderate	Moderate
Sedgwick	 	   	     			High	   Moderate 
433310:	' 	I	i i		i i		i I
Sultz					Low	Low	High
Ashwabay	 	 	 		Low	Low	   Moderate
Rubicon	   	   			Low	Low	   High 
433314: Manistee		i !	i i i i		l Low l	High	     Moderate
Kellogg	 	 	 		Low	High	   High
Ashwabay	   	!   !	 		Low	Low	   Moderate 
433326: Rubicon	   	 	 		l Low l	Low	     High
433379: Allendale	   	   	 			High	     Moderate
433515: Lupton	   	   	 		   High	Moderate	 
Cathro	 	 			High	Moderate	   Moderate 
Tawas	 	!   !	 		High	Moderate	Low
433572: Portwing	   	 	 			High	     Moderate
Herbster	Abrupt textural   change	   40-60 	40-60   	Noncemented	Moderate       Moderate	High	   Moderate 
433573: Cornucopia	 	   				High	     Moderate
433582: Croswell	   	   				Low	     High
433599: Annalake	     	     	 			Moderate	     High 

Table 20.-Soil Features-Continued

Table 20.-Soil Features-Continued

Map unit symbol		Doctorio	1aa.		Potential	Diel of	corrosion
and soil name		Depth	tive layer		for	Uncoated	OFFOSION
and soli name	Kind		  Thickness	Hardness	frost action		   Concrete
<u>_</u>		In	In		1	3333	1
i		; <del>=</del>	; == ;		i i		' İ
433600:		i	i i		i i		İ
Annalake		i	i i		Moderate	Moderate	High
I		I	1 1		1		l
433671:		I	l I		1		l
Arnheim			! !		High	High	Moderate
433676: I		ļ	!!!		!		]
Redrim	Lithic bedrock	I I 10-20			Low	   Moderate	I   High
I I	DICHIC DEGICCA	1 10 20 1	i i		1 20 1	Moderace	l
433679:		i	i i		i i		i İ
Lapoin	Lithic bedrock	20-40	i i		Moderate	High	Moderate
I		I	l I		1		l
433686:		!	!!!		! !		<u> </u>
Zeba	Lithic bedrock	20-40	! !		High	Moderate	Moderate
433729: I		! !	! !				l i
Sultz		! !	! !		l Low	l Low	ı   High
I		i i	i i		1 20	====	l
433739:		i İ	i i		i i		İ
Moquah					Moderate	Moderate	Moderate
1		I	l l		1	l	l
433771.		!	!!!		!		
Beaches		ļ	!!!		!		]
433802.		! !	! ! ! !		1	] ]	l I
Udorthents, ravines and		i i	i i		i		İ
escarpments		i	i i		i i		İ
i		İ	i i		i i		l
452739.		I	l I		1		l
Water		I	l l		1		l
450765		!	!!!				l
452765:   Abbaye	Lithic bedrock	I   20-40	 		Moderate	   Low	   Moderate
ADDAYE	HICHIC DedIOCK	20 <del>1</del> 0	; ;		Moderace	l HOW	Moderate 
Lapoin	Lithic bedrock	20-40	i i		Moderate	High	Moderate
Ī		I	l I		1		l
1383557:		I	l l		1		l
Au Gres			! !		Low	Low	High
1383580: I		ļ	!!!		!		]
Loxley		! !	! !		High	   Moderate	I   High
lowiey			i i			Moderace	l
Beseman			i i		High	Moderate	High
I		I	l I		1	l	I
Dawson					High	Moderate	High
1000501		!	!!!				<u> </u>
1383581:   Rifle		I	l		l Himb	l High	   Tarr
VIII6			,   		High	High	Low
		1					

Table 20.-Soil Features-Continued

Man and annhal		Dantai a	hi 1		l Datastial I	Diele of	
Map unit symbol			tive layer		Potential		corrosion
and soil name	Kind	Depth		Hardness	for	Uncoated	l Conomoto
	Kind		Thickness	nardness	frost action	steel	Concrete
!		l <u>In</u>	! <u>In</u> !		! !		!
1383603: I		!	!!!		! !		!
Cornucopia		l I			Moderate	High	   Moderate
Colineopia		i	, ,		Moderace	птдп	Moderate
1383658:		! !	: :		' '		! !
Deerton	Lithic bedrock	l 20-40			Low	Low	'   High
		,	i i		i i		i
Brownstone	Lithic bedrock	20-40	i i		Low	Low	High
İ		İ	i i		i i		ĺ
1383660:		I	1 1		1 1		I
Deerton	Lithic bedrock	20-40			Low	Low	High
I		l	1 1		1 1		l
Brownstone	Lithic bedrock	20-40			Low	Low	High
!					!!!!		
1383662:		1	!!!			_	
Abbaye	Lithic bedrock	20-40			Moderate	Low	Moderate
1383665:		 					! !
Allendale		! !	' '		Moderate	High	   Moderate
I		' 	i i		110401400		l
Wakeley			i i		Moderate	High	   Moderate
i		İ	i i		i i	_	İ
Kinross					Moderate	High	Moderate
I		I	1 1		1		l
1383960:		I	1 1		1 1		I
Flink					Moderate	Moderate	High
1444257		!	!!!		! !		<u> </u>
1444357:   Arnheim		 			l Himb	II i ah	   Moderate
Armerm			, ,		High	High	Moderate
1444359.		! !	: :		' '		! 
Beaches		' 	i i		i i		i i
		i	i i		i i		i i
1444367.		İ	i i		i i		İ
Udorthents, ravines and		İ	i i		i i		İ
escarpments		I	1 1		1		I
I		l	1 1		1 1		l
1444378:		1	1		1 1		I
Wakefield	Fragipan	16-24	8-26		Moderate	Moderate	Moderate
1444270		!	!!!		! !		<u> </u>
1444379:   Wakefield	Emaginan	I   16−24	ı 8-26 I		Moderate	Moderate	   Moderate
wakerieid	Fragipan	10-24 	0-20   		Moderate	Moderate	Moderate
1444388:			· !		· !		İ
Allendale		' 	' '		Moderate	High	   Moderate
		I	į i			<b>3</b>	
1444402:		I	ı i		i i		I
Tonkey					High	High	Low
I		I	1 1		1 1		I

Table 20.-Soil Features-Continued

Map unit symbol		Postria	tive layer		Potential	Risk of corrosion	
and soil name	<u> </u>	Depth	<del>_</del>		for I	` <del></del>	
and soil name	I I Kind		  Thickness	Hardness	frost action	Uncoated steel	I   Concrete
	ı Kiliü	co cop	In	naruness	I I I	20001	CONCLECE
	 	! <del>!!!</del>	! <del>***</del>		1 1		 
1444410:	l I	 					 
Tula	ı   Fragipan	   15-30	1 10-48		High	High	ı   Moderate
1414	l rragipan	1 13 30	1 10 40 1		l magni i	111911	Moderace
1444414:	! 	i	i i		i i		i i
Lupton			i i		High	Moderate	Low
-	İ	ĺ	i i		i i		İ
Cathro					High	Moderate	Moderate
		1	1 1		1		l
Tawas					High	Moderate	Low
	  -		!!!		!!!		<u> </u>
1444425:	 	1				*** . 1.	
Lerch					High	High	Moderate
Herbster	   Abrunt textural	   40-60	I 40-60 I	Noncemented	Moderate	High	   Moderate
Helbstel	change	1 40 00	1 40 00 1	Noncemented	Moderace	niign	Moderace
		' 	i i		i i		' 
1444426:	i I	i	i i		i i		İ
Portwing		· 	i i		Moderate	High	Moderate
_	l	1	1 1		1	_	I
Herbster	Abrupt textural	40-60	40-60	Noncemented	Moderate	High	Moderate
	change	1	1 1		1		l
		1	!!!		]		l
1444427:	 	!				*** . 1.	
Cornucopia					Moderate	High	Moderate
1444428:	l I	 					 
Cornucopia	I	· 			Moderate	High	   Moderate
сотпасорта	! 	i i	i i		Moderate	111911	Moderace 
1444431:	: 	i	i i		i i		i i
Croswell		· 	i i		l Low	Low	High
	l	1	1 1		1		Ī
1444432:		1	1 1		1		l
Gogebic	Fragipan	18-36	10-48		Moderate	Moderate	High
	  -	!	!!!		!!!		<u> </u>
1444435:	  -	l 				*** . 1.	 
Iosco					Moderate	High	Low
1444457:	! 	! !			! ! ! !		! 
Redrim	   Lithic bedrock	1 1 10-20	i i		Low	Moderate	'   High
		, 	i i		i i		
1444459:	i İ	i	i i		i i		İ
Zeba	Lithic bedrock	20-40			High	Moderate	Moderate
	l	I	1 1		I I		I
1444460:	l	I	1 1		1 1		l
Abbaye	Lithic bedrock	20-40			Moderate	Low	Moderate
<b>.</b>		1 00 10	! !			*** *	
Lapoin	Lithic bedrock	20-40			Moderate	High	Moderate
	I	I	1 1		1 1		I

Table 20.—Soil Features—Continued

Man unit combal	· · · · · · · · · · · · · · · · · · ·	Dootnio	+i 1	Potential	Risk of corrosion		
Map unit symbol			tive layer		•		corrosion
and soil name	Kind	Depth	  Thickness	Hardness	for    frost action	Uncoated steel	   Concrete
	KING	co cop	In	- Haraness	1	30001	l concrete
		¦ <del>==</del>	¦ <del>==</del>				! 
1444461:		! 	i i		;		! 
Abbaye	Lithic bedrock	20-40	i i		Moderate	Low	   Moderate
Zeba  	Lithic bedrock	   20-40 			High	Moderate	   Moderate 
1444477:		i I	i i		i		i i
Cublake			i i		Low	Low	Moderate
I		I	1 1		1		I
Croswell					Low	Low	Moderate
			!!!		!		
Ashwabay		!			Low	Low	Moderate
1444478:		! !	! !		! !		 
Cublake		! !			Low	Low	   Moderate
Cubiake		! 	i i		I TOW I	HOW	Moderace
Croswell		i	i i		Low	Low	   Moderate
i		İ	i i		į i		İ
Ashwabay					Low	Low	Moderate
I		I	1 1		1		l
1444479:		I	1 1		1		l
Morganlake		!			Low	Low	Moderate
1444480:			!!!		!		
Morganlake		! !			l Low I	Low	I   Moderate
Horganitake			i i		1 204 1	TOW	Moderace 
1444481:		i	i i		i i		i İ
Kellogg					Low	High	Moderate
I		I	1 1		1		l
Allendale		I			Moderate	High	Moderate
!		!	!!!		! !	_	l
Ashwabay					Low	Low	Moderate
1444482:		 					 
Kellogg		' 	i i		l Low	High	   Moderate
I		i	i i		i		i
Allendale		i	i i		Moderate	High	Moderate
I		I	1 1		1 1		l
Ashwabay					Low	Low	Moderate
		!	!!!!		! !		<u> </u>
1444486:		 				*** . 1.	
Sedgwick					High	High	Moderate
Munuscong		! !			High	High	l Low
Handscong			i i			111911	<u>10</u> #
1444487:		İ	i i		i i		I
Superior		i	i i		Moderate	Moderate	Moderate
I		I	1 1		1 1		I
Sedgwick		I			High	High	Moderate
I		I	1 1		1		l

Table 20.—Soil Features—Continued

Map unit symbol	<del> </del>	tive layer	Potential	Risk of corrosion			
and soil name	Depth				for	Uncoated	I
	Kind		Thickness	Hardness	frost action	steel	Concrete
i	·	In	In		i i		<u> </u>
ı					1 1		I
1444488:		l	1 1		1		I
Superior					Moderate	Moderate	Moderate
  Sedgwick	 	 	 			High	   Moderate
i		I	i i		i i	-	İ
1444489:		l	1 1		1 1		l
Sultz	<del></del>	 			Low	Low	High
Ashwabay		' 			Low	Low	ı   Moderate
!		  -	!!!		! !	_	
Rubicon	<del></del>	 	 		Low	Low	High 
1444492:		i İ	i i		i i		i İ
Manistee					Low	High	Moderate
  Kellogg	 	 	 		Low	High	I   High
!		l	!!!		! !	_	l
Ashwabay	 	 	 		Low	Low	Moderate 
1444506:		i	i i		i i		i I
Keweenaw					Low	Low	Moderate
   Rubicon	 	 			Low	Low	   High
Rubicon		' 	i i		10"	10#	g.:
1444507:		l	1 1		1 1		I
Keweenaw					Low	Low	Moderate
Rubicon	 	 	 		Low	Low	I   High
I		l	1 1		1 1		I
1444585:	 	l 	! !		Madamata	T	   <b>W</b> adamata
Meehan, beaches	<del></del> 	 	 		Moderate	Low	Moderate 
1444586:		İ	i i		i i		İ
Wurtsmith, beaches					Low	Low	Moderate
1444587:		! 					! 
Grayling, beaches			i i		Low	Low	Moderate
1500000			!!!		! !		  -
1529830:   Meehan, beaches	 	l I			Moderate	Low	   Moderate
Heenan, Beaches		' 	i i		Moderate	10#	Moderace
1700372:	l	I	ı i		ı i		l
Loxley		 			High	Moderate	High
  Beseman		 	·		High	Moderate	I   High
I		l	1 1		I I	_	<u> </u>
Dawson	<del></del>				High	Moderate	High
	ı				1 1		

Table 20.-Soil Features-Continued

Map unit symbol		Restric	tive layer	Potential	Risk of	corrosion	
and soil name		Depth			for	Uncoated	1
1	Kind	to top	Thickness	Hardness	frost action	steel	Concrete
		I In	<u>In</u>		1 1		I
1700373:		 	; ;		;		İ
Rifle					High	High	Low
1700374:		! 	; ;		i i		i
Allendale					Moderate	High	Moderate
Wakeley		 			Moderate	High	Moderate
Kinross		 	 		Moderate	High	Moderate
1702605:		İ			iii		
Menominee		 	 		Low	Low	Moderate
1702606:		i	i i		i i		i
Deerton	Lithic bedrock	20-40 	 		Low	Low	High
Brownstone	Lithic bedrock	20-40	i i		l Low l	Low	High
1702607:		İ	i i		iii		i
Deerton	Lithic bedrock	20-40			Low	Low	High
Brownstone	Lithic bedrock	20-40	<u> </u>		l Low l	Low	High
1702608:		! 	! ! !		;		 
Abbaye	Lithic bedrock	20-40			Moderate	Low	Moderate
1711685:		! 	; ;		-		
Cublake					Low	Low	Moderate
Keweenaw		 			Low	Low	Moderate

Table 21.—Taxonomic Classification of the Soils

Soil name	Family or higher taxonomic class
Abbaye	  Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods
	Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods
Annalake	Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Haplorthods
	Coarse-loamy, mixed, superactive, nonacid, frigid Typic Fluvaquents
<del>-</del>	Sandy, isotic, frigid Alfic Oxyaquic Haplorthods
	Sandy, mixed, frigid Typic Endoaquods
Beseman	Loamy, mixed, dysic, frigid Terric Haplosaprists
	Sandy-skeletal, mixed, frigid Typic Haplorthods
Cathro	Loamy, mixed, euic, frigid Terric Haplosaprists
	Fine, mixed, active, frigid Haplic Glossudalfs
Croswell	Sandy, mixed, frigid Oxyaquic Haplorthods
	Sandy, mixed, frigid Oxyaquic Haplorthods
	Sandy or sandy-skeletal, mixed, dysic, frigid Terric Haplosaprists
	Sandy, mixed, frigid Typic Haplorthods
	Sandy, mixed, frigid Typic Epiaquods
Gogebic	Coarse-loamy, isotic, frigid Alfic Oxyaquic Fragiorthods
	Isotic, frigid Typic Udipsamments
	Fine, mixed, active, frigid Aeric Glossaqualfs
Iosco	Sandy over loamy, mixed, active, frigid Argic Endoaquods
	Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods
	Sandy, mixed, frigid Alfic Haplorthods
	Sandy, mixed, frigid Typic Endoaquods
	Fine, mixed, active, frigid Alfic Oxyaquic Haplorthods
Lerch	Very fine, mixed, active, nonacid, frigid Vertic Epiaquepts
	Dysic, frigid Typic Haplosaprists
	Euic, frigid Typic Haplosaprists
	Sandy over clayey, mixed, active, frigid Alfic Haplorthods
	Mixed, frigid Aquic Udipsamments
	Sandy over loamy, mixed, active, frigid Alfic Haplorthods
	Coarse-loamy, mixed, superactive, nonacid, frigid Typic Udifluvents
	Sandy over loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods
_	Coarse-loamy over clayey, mixed, active, nonacid, frigid Mollic Epiaquepts
	Fine, mixed, active, frigid Oxyaquic Glossudalfs
	Sandy-skeletal, mixed, frigid Entic Lithic Haplorthods
	Euic, frigid Typic Haplohemists
	Sandy, mixed, frigid Entic Haplorthods
_	Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaquods
	Sandy, mixed, frigid Entic Haplorthods
	Coarse-loamy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods
	Sandy or sandy-skeletal, mixed, euic, frigid Terric Haplosaprists
_	Coarse-loamy, mixed, semiactive, nonacid, frigid Mollic Endoaquepts
	Coarse-loamy, mixed, superactive, frigid Argic Fragiaquods
Udorthents, ravines and	
escarpments	
	Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Fragiorthods
<del>-</del>	Sandy over clayey, mixed, semiactive, nonacid, frigid Aeric Epiaquents
	Mixed, frigid Oxyaquic Udipsamments
7.h	Coarse-loamy, mixed, active, frigid Argic Endoaquods

```
ORDER
  Suborder
     Great Group
        Subgroup
          Series or Higher Category
ALFISOLS
  Aqualfs
     Glossaqualfs
       Aeric Glossaqualfs
          Herbster-----Fine, mixed, active, frigid Aeric Glossaqualfs
  Udalfs
     Glossudalfs
       Haplic Glossudalfs
          Cornucopia------Fine, mixed, active, frigid Haplic Glossudalfs
        Oxyaquic Glossudalfs
          Portwing------------------------Fine, mixed, active, frigid Oxyaquic Glossudalfs
ENTISOLS
  Aquents
     Fluvaquents
        Typic Fluvaquents
          Arnheim------Coarse-loamy, mixed, superactive, nonacid, frigid Typic Fluvaquents
     Epiaquents
       Aeric Epiaquents
          Wakeley-----Sandy over clayey, mixed, semiactive, nonacid, friqid Aeric
                                     Epiaquents
  Fluvents
     Udifluvents
        Typic Udifluvents
          Moquah------Coarse-loamy, mixed, superactive, nonacid, frigid Typic Udifluvents
  Orthents
     Udorthents
          Udorthents, ravines and
           escarpments------Udorthents
  Psamments
     Udipsamments
        Typic Udipsamments
          Grayling------Isotic, frigid Typic Udipsamments
       Aquic Udipsamments
          Meehan-----Mixed, frigid Aquic Udipsamments
        Oxvaguic Udipsamments
          Wurtsmith-----Mixed, frigid Oxyaquic Udipsamments
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Table 22.-Soil Classification Kev

## Table 22.-Soil Classification Key-Continued

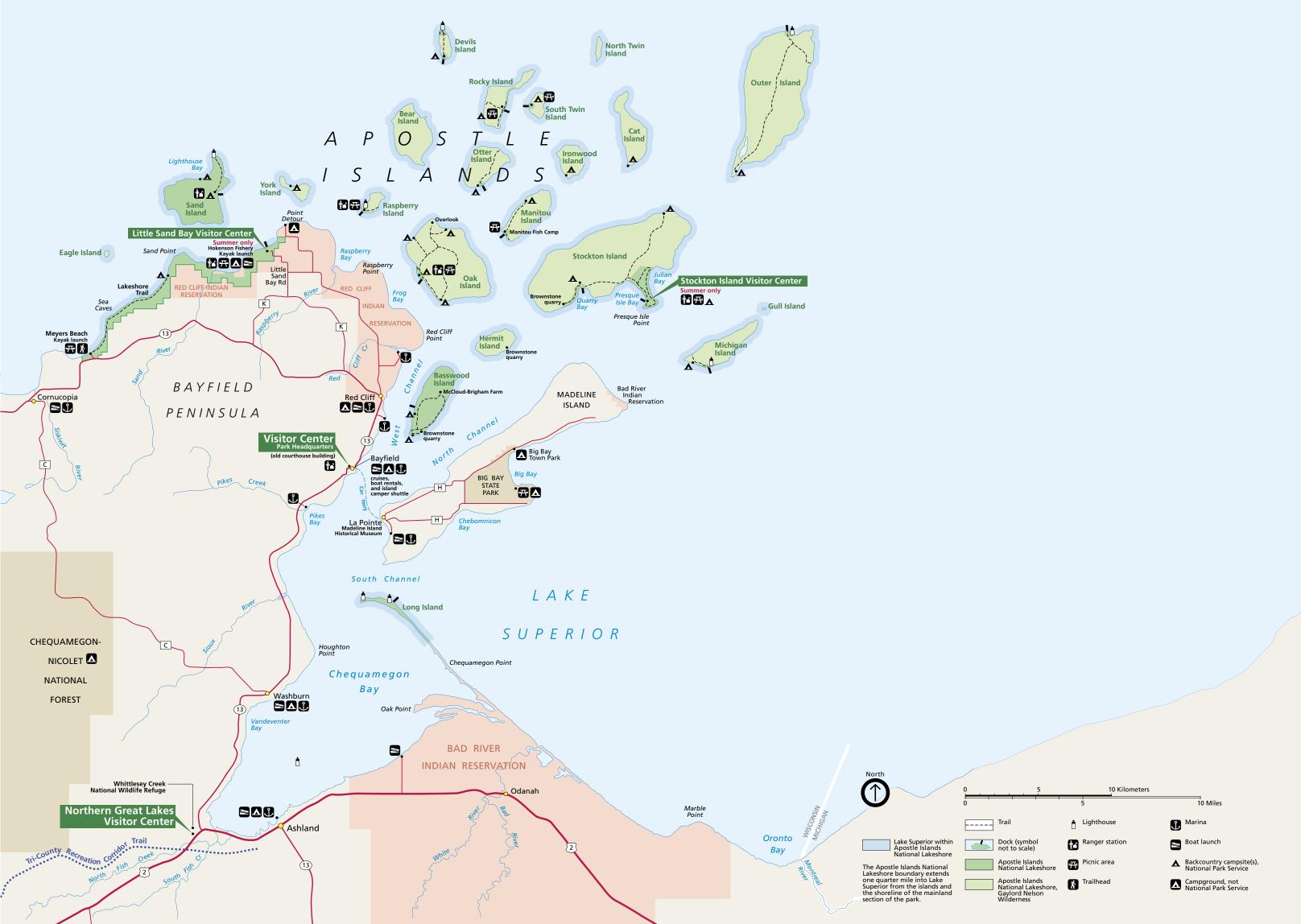
```
ORDER
  Suborder
    Great Group
       Subgroup
         Series or Higher Category
HISTOSOLS
  Hemists
    Haplohemists
       Typic Haplohemists
         Rifle-----Euic, frigid Typic Haplohemists
  Saprists
    Haplosaprists
       Typic Haplosaprists
         Loxley------Dysic, frigid Typic Haplosaprists
         Lupton-----Euic, frigid Typic Haplosaprists
       Terric Haplosaprists
         Beseman------ Hoamy, mixed, dysic, frigid Terric Haplosaprists
         Cathro-----Loamy, mixed, euic, frigid Terric Haplosaprists
         Dawson-----Sandy or sandy-skeletal, mixed, dysic, frigid Terric Haplosaprists
         Tawas-----Sandy or sandy-skeletal, mixed, euic, frigid Terric Haplosaprists
INCEPTISOLS
  Aquepts
    Endoaquepts
       Mollic Endoaguepts
         Tonkey------Coarse-loamy, mixed, semiactive, nonacid, frigid Mollic Endoaquepts
    Epiaquepts
       Vertic Epiaquepts
         Lerch------Very fine, mixed, active, nonacid, frigid Vertic Epiaquepts
       Mollic Epiaquepts
         Munusconq-----Coarse-loamy over clayey, mixed, active, nonacid, frigid Mollic
                                  Epiaquepts
SPODOSOLS
  Aquods
    Fragiaguods
       Argic Fragiaquods
         Tula------- frigid Argic Fragiaquods
    Endoaguods
       Typic Endoaquods
         Au Gres-----Sandy, mixed, frigid Typic Endoaquods
         Kinross-----Sandy, mixed, frigid Typic Endoaquods
       Argic Endoaquods
         Zeba-----Coarse-loamy, mixed, active, frigid Argic Endoaquods
         Iosco------Sandy over loamy, mixed, active, frigid Argic Endoaquods
    Epiaquods
       Typic Epiaquods
         Flink-----Sandy, mixed, frigid Typic Epiaquods
       Alfic Epiaguods
         Sedgwick-----Coarse-loamy over clayey, mixed, active, frigid Alfic Epiaquods
         Allendale-----Sandy over clayey, mixed, semiactive, frigid Alfic Epiaquods
```

Table 22.—Soil Classification Key—Continued

```
ORDER
  Suborder
     Great Group
       Subgroup
         Series or Higher Category
SPODOSOLS-Continued
  Orthods
     Fragiorthods
       Alfic Oxyaquic Fragiorthods
         Gogebic-----Coarse-loamy, isotic, frigid Alfic Oxyaquic Fragiorthods
         Wakefield------Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Fragiorthods
     Haplorthods
       Typic Haplorthods
         Deerton-----Sandy, mixed, frigid Typic Haplorthods
         Brownstone------Sandy-skeletal, mixed, friqid Typic Haplorthods
         Manistee-----Sandy over clayey, mixed, active, frigid Alfic Haplorthods
         Menominee-----Sandy over loamy, mixed, active, frigid Alfic Haplorthods
         Keweenaw-----Sandy, mixed, frigid Alfic Haplorthods
       Entic Lithic Haplorthods
         Redrim-----Sandy-skeletal, mixed, frigid Entic Lithic Haplorthods
       Entic Haplorthods
         Rubicon-----Sandy, mixed, frigid Entic Haplorthods
         Sultz-----Sandy, mixed, friqid Entic Haplorthods
       Oxvaguic Haplorthods
         Croswell-----Sandy, mixed, frigid Oxyaquic Haplorthods
         Cublake-----Sandy, mixed, frigid Oxyaquic Haplorthods
       Alfic Oxvaguic Haplorthods
         Superior-----Coarse-loamy over clayey, mixed, active, frigid Alfic Oxyaquic
                                  Haplorthods
         Abbaye-----Coarse-loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods
         Annalake------Coarse-loamy, mixed, superactive, frigid Alfic Oxyaquic Haplorthods
         Lapoin-----Fine, mixed, active, frigid Alfic Oxyaquic Haplorthods
         Kellogg-----Sandy over clayey, mixed, active, frigid Alfic Oxyaquic Haplorthods
         Morganlake-----Sandy over loamy, mixed, active, frigid Alfic Oxyaquic Haplorthods
         Ashwabay-----Sandy, isotic, frigid Alfic Oxyaquic Haplorthods
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## MAP UNIT LEGEND APOSTLE ISLANDS NATIONAL LAKESHORE, WISCONSIN

U.S. DEPARTMENT OF THE INTERIOR

NATIONAL PARK SERVICE

## <u>SYMBOL</u> <u>NAME</u>

433292	Lerch-Herbster complex, 0 to 3 percent slopes
433296	Cublake-Croswell-Ashwabay complex, 0 to 6 percent slopes
433299	Cublake-Croswell-Ashwabay complex, 6 to 15 percent slopes
433300	Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes
433301	Kellogg-Allendale-Ashwabay complex, 6 to 15 percent slopes
433304	Sedgwick-Munuscong complex, 0 to 6 percent slopes
433305	Superior-Sedgwick complex, 0 to 6 percent slopes
433309	Superior-Sedgwick complex, 6 to 15 percent slopes
433310	Sultz-Ashwabay-Rubicon complex, 15 to 45 percent slopes
433314	Manistee-Kellogg-Ashwabay complex, 15 to 45 percent slopes
433326 433379	Rubicon sand, 0 to 6 percent slopes Allendale loamy fine sand, 0 to 3 percent slopes
433515	Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes
433572	Portwing-Herbster complex, 0 to 6 percent slopes
433573	Cornucopia silt loam, 6 to 15 percent slopes
433582	Croswell sand, 0 to 6 percent slopes
433599	Annalake fine sandy loam, lake terrace, 2 to 6 percent slopes
433600	Annalake fine sandy loam, lake terrace, 6 to 15 percent slopes
433671	Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded
433676	Redrim very cobbly sand, 0 to 6 percent slopes, very stony
433679	Lapoin loam, 0 to 6 percent slopes
433686	Zeba sandy loam, 0 to 6 percent slopes, very stony
433729 433739	Sultz sand, 0 to 6 percent slopes Moquah fine sandy loam, 0 to 3 percent slopes, frequently flooded
433771	Beaches, 2 to 12 percent slopes
433802	Udorthents, ravines and escarpments, 25 to 60 percent slopes
452739	Water
452765	Abbaye-Lapoin complex, 0 to 6 percent slopes
1383557	Au Gres loamy sand, 0 to 3 percent slopes
1383580	Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes
1383581	Rifle peat, 0 to 1 percent slopes
1383603	Cornucopia silt loam, 15 to 45 percent slopes
1383658	Deerton-Brownstone complex, 0 to 6 percent slopes, very stony
1383660	Deerton-Brownstone complex, 6 to 15 percent slopes, very stony
1383662	Abbaye loamy sand, 6 to 15 percent slopes
1383665 1383960	Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes Flink sand, 0 to 3 percent slopes
1444357	Arnheim mucky silt loam, 0 to 1 percent slopes, frequently flooded
1444359	Beaches, 2 to 12 percent slopes
1444367	Udorthents, ravines and escarpments, 25 to 60 percent slopes
1444378	Wakefield fine sandy loam, 1 to 6 percent slopes, stony
1444379	Wakefield fine sandy loam, 6 to 18 percent slopes, stony
1444388	Allendale loamy fine sand, 0 to 3 percent slopes
1444402	Tonkey sandy loam, 0 to 2 percent slopes
1444410	Tula fine sandy loam, 1 to 6 percent slopes, stony
1444414	Lupton, Cathro, and Tawas soils, 0 to 1 percent slopes
1444425	Lerch-Herbster complex, 0 to 3 percent slopes
1444426 1444427	Portwing-Herbster complex, 0 to 6 percent slopes Cornucopia silt loam, 6 to 15 percent slopes
1444428	Cornucopia silt loam, 15 to 45 percent slopes
1444431	Croswell sand, 0 to 6 percent slopes
1444432	Gogebic fine sandy loam, 1 to 6 percent slopes, very stony
1444435	losco loamy sand, 0 to 4 percent slopes
1444457	Redrim very cobbly sand, 0 to 6 percent slopes, very stony
1444459	Zeba sandy loam, 0 to 6 percent slopes, very stony
1444460	Abbaye-Lapoin complex, 0 to 6 percent slopes
1444461	Abbaye-Zeba complex, 0 to 6 percent slopes, very stony
1444477	Cublake-Croswell-Ashwabay complex, 0 to 6 percent slopes
1444478	Cublake-Croswell-Ashwabay complex, 6 to 15 percent slopes
1444479	Morganlake loamy sand, 0 to 6 percent slopes
1444480 1444481	Morganlake loamy sand, 6 to 15 percent slopes Kellogg-Allendale-Ashwabay complex, 2 to 6 percent slopes
1444482	Kellogg-Allendale-Ashwabay complex, 0 to 15 percent slopes
1444486	Sedgwick-Munuscong complex, 0 to 6 percent slopes
1444487	Superior-Sedgwick complex, 0 to 6 percent slopes
1444488	Superior-Sedgwick complex, 6 to 15 percent slopes
1444489	Sultz-Ashwabay-Rubicon complex, 15 to 45 percent slopes
1444492	Manistee-Kellogg-Ashwabay complex, 15 to 45 percent slopes
1444506	Keweenaw, stony-Rubicon complex, 0 to 6 percent slopes
1444507	Keweenaw, stony-Rubicon complex, 6 to 15 percent slopes
1444585	Meehan sand, beaches, 0 to 2 percent slopes
1444586	Wurtsmith sand, beaches, 0 to 3 percent slopes
1444587 1529830	Grayling sand, beaches, 2 to 12 percent slopes Meehan sand, beaches, 0 to 2 percent slopes
1700372	Loxley, Beseman, and Dawson soils, 0 to 1 percent slopes
1700372	Rifle peat, 0 to 1 percent slopes
1700374	Allendale-Wakeley-Kinross complex, 0 to 6 percent slopes
1702605	Menominee loamy sand, 15 to 30 percent slopes
1702606	Deerton-Brownstone complex, 0 to 6 percent slopes, very stony
1702607	Deerton-Brownstone complex, 6 to 15 percent slopes, very stony
1702608	Abbaye loamy sand, 6 to 15 percent slopes
1711685	Cublake-Keweenaw, stony complex, 0 to 6 percent slopes

